

SHARP SERVICE MANUAL

SY210R90GCPH/



HIGH SPEED CONVECTION MICROWAVE OVEN

MODEL R-90GCH

In the interest of user-safety the oven should be restored to its original condition and only parts identical to those specified should be used.

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CAUTION

MICROWAVE RADIATION

Personnel should not be exposed to the microwave energy which may radiate from the magnetron or other microwave generating devices if it is improperly used or connected. All input and output microwave connections, waveguides, flanges and gaskets must be secured.

Never operate the device without a microwave energy absorbing load attached.

Never look into an open waveguide or antenna while the device is energized.

VARNING

MICKROVAGSSTRÅLING

Personal får inte utsättas för mikrovågsenergi som kan utstråla från magnetronen eller andre mikrovågsstrålande anordningar om dessa är felanslutna eller används på fel sätt. Alla in-och utgångsanslutningar för mikrovågor, vågledare, flänsar och packningar måste vara fast anslutna.

Mikrovågsgeneratoren får inte arbeta utan att absorberande belastning är ansluten. Titta aldrig in i en öppen vågledare eller antenn när mikrovågsgeneratoren är påkopplad eller laddad.

VAROITUS

MIKROAALTOSÄTELYÄ

Käyttäjä ei saa joutua alttiiksi mikroaaltoenergialle, jota voi säteillä magnetronista tai muusta mikroaaltoja kehittävästä laitteesta, jos sitä käytetään tai jos se kytketään väärin. Kaikkien mikroaaltoliitännöiden sekä syöttö-että ulostulopuolella, aaltoputkien laippojen ja tiivisteiden tulee olla varmistettuja.

Mikroaaltouunnia ei koskaan saa käyttää ilman kuormaa jossa mikroaaltoenergiaa kuluu. Avoimeen aaltoputkeen tai antenniin ei koskaan saa katsoa virran ollessa kytkettynä.

ADVARSEL

MIKROBØLGESTRÅLING

Personell må ikke utsettes for mikrobølge-energi som kan utståles fra magnetronen eller andre mikrobølge-generende deler dersom apparatet feilbetjenes eller blir feiltikoplet. Alle inn-og ut-tilkoplinger i forbindelse med mikrobølge-strålingen, bølgeledere, flenser og tetningsringer/pakninger må festes ordentlig.

Aldri bruk apparatet med mindre en mikrobølge-absorberende last er plassert i ovnsrommet.

Aldri se direkte inn i en åpen bølgeleder eller antenne imens apparatet er strømførende.

ADVARSEL

MIKROBØLGEBESTRÅLING

Man bør ikke udsætte sig for mikrobølgebestråling fra magnetronen eller andre mikrobølgefrembringende anordninger, hvilket kan ske hvis apparatet er forkert tilsluttet eller bruges forkert. Alle mikrobølgeindgange og-udgange, bølgeledere, flanger og tætningsstrimler må være forsvarligt udført.

Anvend aldrig ovnen uden en mikrobølgesabsorberende anordning. Se aldrig ind i en åben bølgeleder eller antenne, mens ovnen er i brug.

SERVICE MANUAL

SHARP

HIGH SPEED CONVECTION MICROWAVE OVEN

R-90GCH

GENERAL IMPORTANT INFORMATION

This Manual has been prepared to provide Sharp Corp. Service engineers with Operation and Service Information.

It is recommended that service engineers carefully study the entire text of this manual, so they will be qualified to render satisfactory customer service.

WARNING

- Note:** The parts marked "*" are used at voltage more than 250V. (Parts List)
- Anm:** Delar märket med "*" har en spänning överstigande 250V.
- Huom:** Huolto-ohjeeseen merkitty "tähdellä" osat joissa jännite on yli 250 V.
- Bemerk:** Deler som er merket "asterisk" er utsatt for spenninger over 250V til jord.
- Bemærk:** "Dele mærket med stjerne benyttes med højere spænding end 250 volt.

WARNING

Never operate the oven until the following points are ensured.

- (A) The door is tightly closed.
- (B) The door brackets and hinges are not defective.
- (C) The door packing is not damaged.
- (D) The door is not deformed or warped.
- (E) There is not any other visible damage with the oven.

Servicing and repair work must be carried out only by trained service engineers.

Removal of the outer wrap gives access to potential above 250V.

All the parts marked "Δ" on the parts list may cause undue microwave exposure, by themselves, or when they are damaged, loosened or removed.

SERVICING

PRODUCT SPECIFICATIONS

GENERAL INFORMATION

APPEARANCE VIEW

OPERATING SEQUENCE

FUNCTION OF IMPORTANT
COMPONENTS

TROUBLESHOOTING GUIDE
AND TEST PROCEDURE

TOUCH CONTROL PANEL

COMPONENT REPLACEMENT
AND ADJUSTMENT PROCEDURE

MICROWAVE MEASUREMENT

TEST DATA AT A GLANCE

WIRING DIAGRAM

PARTS LIST

SHARP CORPORATION

OSAKA, JAPAN

SERVICING

WARNING TO SERVICE PERSONNEL

(GB) Microwave ovens contain circuitry capable of producing very high voltage and current, contact with following parts will result in electrocution.
High voltage capacitor, Power transformer, Magnetron, High voltage rectifier assembly, High voltage harness.

REMEMBER TO CHECK 3D

- 1) Disconnect the supply.
- 2) Door opened, and wedged open.
- 3) Discharge high voltage capacitor.

WARNING: AGAINST THE CHARGE OF THE HIGH-VOLTAGE CAPACITOR

The high-voltage capacitor remains charged about 60 seconds after the oven has been switched off. Wait for 60 seconds and then short-circuit the connection of the high-voltage capacitor (that is, of the connecting lead of the high-voltage rectifier) against the chassis with the use of an insulated screwdriver.

Sharp recommend that wherever possible fault-finding is carried out with the supply disconnected. It may in, some cases, be necessary to connect the supply after the outer case has been removed, in this event carry out 3D checks and then disconnect the leads to the primary of the power transformer. Ensure that these leads remain isolated from other components and the oven chassis. (Use insulation tape if necessary.) When the testing is completed carry out 3D checks and reconnect the leads to the primary of the power transformer.

REMEMBER TO CHECK 4R

- 1) Reconnect all leads removed from components during testing.
- 2) Replace the outer case (cabinet) and back plate.
- 3) Reconnect the supply.
- 4) Run the oven. Check all functions.

Microwave ovens should not be run empty. To test for the presence of microwave energy within a cavity, place a cup of cold water on the oven turntable, close the door and set the power to HIGH and set the microwave timer for two (2) minutes. When the two minutes has elapsed (timer at zero) carefully check that the water is now hot. If the water remains cold carry out 3D checks and re-examine the connections to the component being tested.

When all service work is completed, and the oven is fully assembled, the microwave power output should be checked and a microwave leakage test should be carried out.

(NL) Magnetronovens bevatten circuits die een zeer hoge spanning en stroom kunnen voortbrengen. Contact met de volgende onderdelen kan elektrocutie tot gevolg hebben.
Hoogspanningscondensator, hoogspanningstransformator, magnetron, hoogspanningsgelijkrichter, hoogspannings kabelboom.

VERGEET DE VOLGENDE 3 STAPPEN NIET

- 1) Haal de stekker uit het stopcontact.
- 2) Open de deur en zorg ervoor dat hij niet dicht kan vallen.
- 3) Ontlaad de hoogspanningscondensator.

PAS OP VOOR DE ELECTRISCHE LADING VAN DE HOOGSPANNINGSCONDENSATOR

De hoogspanningscondensator blijft nog ongeveer 60 seconden lang opgeladen, nadat de oven is uitgeschakeld. Wacht 60 seconden voordat u de verbinding van de hoogspannings-condensator (m.a.w. de verbindingdraad van de hoogspanningsgelijkrichter) met een geïsoleerde schroevendraaier kortsluit tegen het chassis.

Sharp beveelt ten sterkste aan dat, voor zover mogelijk, defecten worden opgespoord wanneer de stekker uit het stopcontact is gehaald. Soms is het nodig om de stroomtoevoer weer tot stand te brengen nadat de buitenmantel verwijderd is. Herhaal dan de bovengenoemde 3 stappen en haal de elektrische draden uit de primaire zijde van de vermogenstransformator. Zorg ervoor dat deze draden geïsoleerd blijven van andere elementen en van het chassis van de oven. (Gebruik zo nodig isolatieband.) Wanneer de test is uitgevoerd, herhaalt u de bovenstaande 3 stappen en verbindt u de elektrische draden weer aan de primaire zijde van de vermogenstransformator.

VERGEET DE VOLGENDE 4 STAPPEN NIET

- 1) Sluit de draden weer aan die zijn losgehaald voor de test.
- 2) Plaats de buitenmantel weer om het toestel heen (kabinet) en achterplaat.
- 3) Stop de stekker weer in het stopcontact.
- 4) Zet de oven aan. Controleer alle functies.

Magnetronovens mogen niet leeg aangezet worden. Om te controleren of er microgolf-energie binnen de oven wordt geproduceerd, plaatst u een mok met koud water op de draaitafel van de oven, sluit de deur, zet de oven op HIGH en stelt de klok van de magnetron in op twee (2) minuten. Wanneer de twee minuten voorbij zijn (klok staat op nul), controleert u voorzichtig of het water heet is. Indien het water nog steeds koud is, herhaalt u de allereerste drie stappen en controleer nogmaals de aansluitingen naar de geteste onderdelen.

Wanneer alle reparaties zijn uitgevoerd en de oven weer in elkaar is gezet, moet de het magnetronvermogen worden gecontroleerd en moet worden gecontroleerd of er geen microgolflekage is.

- E** Los hornos de microondas contienen circuitos eléctricos capaces de producir voltajes de alta tensión y descargas eléctricas. Para evitar el riesgo de electrocución, absténgase de tocar los siguientes componentes: condensador de alta tensión, transformador de alta tensión, magnetrón, dispositivo del rectificador de alta tensión y arnés de alta tensión.

RECUERDE LA COMPROBACION 3D

- 1) Desconecte la alimentación.
- 2) Deje la puerta abierta y calzada.
- 3) Descargue el condensador de alto voltaje.

ADVERTENCIA SOBRE LA CARGA DEL CONDENSADOR DE ALTO VOLTAJE

El condensador de alto voltaje permanece cargado unos 60 segundos después de haber apagado el horno. Espere 60 segundos y luego ponga en cortocircuito la conexión del condensador de alto voltaje (esto es, del conductor de conexión del rectificador de alto voltaje) al chasis con un destornillador de mango aislado.

Se recomienda encarecidamente que siempre que sea posible la localización de fallos se realice con la alimentación desconectada. Puede ser que en algunos casos sea necesario conectar la alimentación después de haber retirado la carcasa exterior. En este caso, realice las comprobaciones 3D y luego desconecte los conductores del primario del transformador de alimentación. Asegúrese de que estos conductores permanezcan aislados de otros componentes y del chasis del horno. (Use cinta aislante si es necesario). Cuando termine la prueba efectúe las comprobaciones 3D y reconecte los conductores al primario del transformador de alimentación.

RECUERDE LA COMPROBACION 4C

- 1) Conecte todos los componentes desconectados de los componentes durante la prueba.
- 2) Coloque la carcasa exterior (cabinas) y la placa posterior
- 3) Conecte la alimentación.
- 4) Compruebe todas sus funciones después de poner en marcha el horno.

Los hornos de microondas no deben funcionar vacíos. Para comprobar la presencia de energía de microondas dentro de una cavidad, coloque una taza de agua fría en el plato giratorio del horno, cierre la puerta y ponga la potencia en HIGH (alta) y coloque el temporizador en dos (2) minutos. Cuando transcurran los dos minutos (temporizador a cero) compruebe cuidadosamente que el agua se ha calentado. Si el agua permaneciese fría, efectúe las comprobaciones 3D y vuelva a examinar las conexiones de los componentes que han sido probados.

Cuando haya terminado la intervención en el equipo y el horno haya sido ensamblado de nuevo completamente, deberá comprobar la potencia de salida de microondas y realizar una prueba de fugas de microondas.

- SV** Mikrovågsugnar innehåller kretsar som producerar mycket höga spänningar och strömmar. Kontakt med följande komponenter kan leda till dödsfall: Högspänningskondensator, transformator, magnetron, högspännings likriktare, högspännings kablage.

KOM IHÅG ATT KONTROLLERA 3 STEG

- 1) Koppla från strömkällan.
- 2) Öppna dörren på glänt.
- 3) Ladda ur högspänningskondensatorn.

VARNING FÖR LADDNINGEN I HÖGSPÄNNINGSKONDENSATORN

Högspänningskondensatorn är laddad i 60 sekunder efter det att ugnen stängts av. Vänta 60 sekunder och korrslut sedan kondensatorms anslutning (dvs anslutningen till högspänningslikriktaren) till chassiet med hjälp av en isolerad skruvmejsel.

Sharp rekommenderar att felsökning sker med strömmen fränkopplad. Ibland kan det vara nödvändigt att koppla på strömmen efter det att höljet avlägsnats, utför då 3 Steg kontrollen och koppla sedan från ledarna till transformatorns primärsida. Se till att ledarna är isolerade från andra komponenter och chassiet. (Använd isoleringsband om det behövs). När Du testat färdigt utför Du 3 Steg kontrollen och ansluter ledningarna till transformatorns primärsida igen.

KOM IHÅG ATT KONTROLLERA 4 STEG

- 1) Anslut alla ledningar som använts vid testning
- 2) Sätt tillbaka ytterhöljet och bakre plåten.
- 3) Anslut strömkällan på nytt.
- 4) Sätt på ugnen. Kontrollera alla funktioner.

Mikrovågsugnar får inte användas tomma. Kontrollera mikrovågsstrålningen i olika delar av ugnen genom att placera en kopp med kallt vatten på ugnens tallrik, stäng dörren, ställ in HIGH och ställ in 2 minuter på timern. När två minuter har gått (timern visar 0) kontrollerar du om vattnet är varmt. Om vattnet fortfarande är kallt utför Du 3 steg kontroller och kontrollerar anslutningarna till varje enskild komponent på nytt.

När all service är klar och ugnen ihopskruvad skall ugnens uteffekt och eventuellt mikrovågsläckage kontrolleras.

- I** I forni a microonde contengono un circuito elettrico in grado di generare tensioni e correnti estremamente elevate. L'eventuale contatto con i seguenti componenti può causare la folgorazione: condensatore ad alta tensione; trasformatore ad alta tensione; magnetron; rettificatore alta tensione; cablaggio ad alta tensione.

TRE OPERAZIONI IMPORTANTI PER INCOMINCIARE

- 1) Scollegare l'alimentazione elettrica.
- 2) Verificare che la porta sia bloccata in posizione aperta.
- 3) Scaricare il condensatore ad alta tensione.

ATTENZIONE AL CONDENSATORE AD ALTA TENSIONE: PUO ESSERE CARICO

Il condensatore ad alta tensione rimane carico per circa 60 secondi dopo lo spegnimento del forno. Occorre quindi aspettare 60 secondi prima di cortocircuitare, utilizzando un cacciavite con impugnatura isolata, il collegamento del condensatore ad alta tensione (cioè del conduttore di collegamento del raddrizzatore ad alta tensione) sul telaio del forno.

Sharp raccomanda, nei limiti del possibile, che la ricerca dei guasti avvenga in assenza di alimentazione elettrica. In alcuni casi tuttavia, può essere necessario alimentare l'apparecchio dopo aver rimosso la scatola esterna. In questo caso eseguire i tre controlli sopra citati e quindi scollegare i connettori dal primario del trasformatore. Assicurarsi che tali connettori non vengano a contatto con altri componenti, né con il telaio del forno (fare uso, se necessario, di nastro isolante). Al termine dell'intervento, eseguire nuovamente i tre controlli e ricollegare i conduttori al primario del trasformatore.

QUATTRO VERIFICHE IMPORTANTI DA NON DIMENTICARE

- 1) Ricollegare tutti i conduttori staccati dai vari componenti durante l'intervento.
- 2) Rimontare la scatola esterna (cabinet) e la piastra posteriore
- 3) Ripristinare l'alimentazione elettrica.
- 4) Rimettere in funzione il forno. Controllare tutte le funzioni.

I forni a microonde non devono mai funzionare a vuoto. Per verificare la presenza di energia da microonde all'interno di una cavità, mettere una tazza di acqua fredda sul piatto rotante del forno, chiudere la porta, regolare la potenza su HIGH ed impostare il temporizzatore su due (2) minuti. Trascorsi i due minuti (temporizzatore a zero), controllare accuratamente che ora l'acqua sia calda. Se l'acqua è rimasta fredda, eseguire i tre controlli iniziali e verificare nuovamente i collegamenti del componente in questione.

Dopo aver portato a termine le operazioni di manutenzione e rimontato il forno, è necessario controllare la potenza delle microonde emesse ed eseguire un test per verificare che non vi sia alcuna dispersione.

PRODUCT DESCRIPTION

SPECIFICATION

ITEM	DESCRIPTION
Power Requirements	230 Volts / 50 Hertz / Single phase, 3 wire earthed
Power Consumption	Microwave cooking 1.8 kW Approx. 8.2 A
	Grill cooking 2.9 kW Approx. 12.6 A
	Convection cooking 2.9 kW Approx. 12.6 A
	DUAL 1 cooking 3.2 kW Approx. 14.0 A
	DUAL 2 cooking 3.2 kW Approx. 14.0 A
Power Output	1000 W nominal of RF microwave energy (measured by method of IEC 60705) Operating frequency 2450 MHz
Top heating element Power Output	1500 W
Side heating element Power Output	1200 W
Case Dimensions	Width 550 mm Height 405 mm (including foot) Depth 625 mm
Cooking Cavity Dimensions	Width 408 mm Height 230 mm Depth 345 mm
Turntable diameter	330 mm
Control Complement	<p>Touch Control System</p> <p>Clock (1:00 - 12:59 or 0:00 - 23:59) / Timer (0 - 99 minutes 90 sec.)</p> <p>Microwave Power for Variable Cooking</p> <p>Repetition Rate;</p> <p>100 % (HIGH) Full power throughout the cooking time</p> <p>70 % (MEDIUM HIGH) approx. 70% of FULL Power</p> <p>50 % (MEDIUM) approx. 50% of FULL Power</p> <p>30 % (MEDIUM LOW) approx. 30% of FULL Power</p> <p>10 % (LOW) approx. 10% of FULL Power</p> <p>Convection temperature control range:</p> <p>250°C, 230°C, 220°C, 200°C, 180°C, 160°C, 130°C, 100°C, 70°C and 40°C</p> <p>MICRO COOK key, LESS/MORE keys, WEIGHT keys</p> <p>MICRO DEFROST key, BASIC COOK key, RECIPES key</p> <p>COMBI MENU keys, TIME keys, LANGUAGE key, STOP key</p> <p>DUAL MODE keys, GRILL key, CONVECTION key</p> <p>MICROWAVE POWER LEVEL key, INFO key</p> <p>TIMER/CLOCK SETTING key, ⬢ (START)+1min key</p>
Set Weight	Approx. 39 kg

GENERAL INFORMATION

WARNING

THIS APPLIANCE MUST BE EARTHED

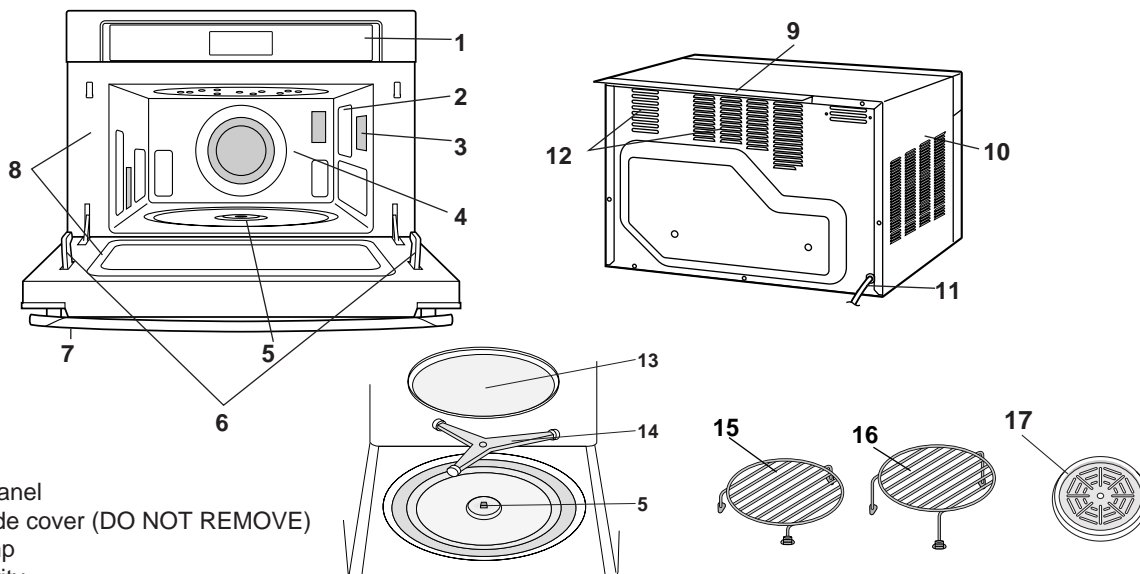
IMPORTANT

THE WIRES IN THIS MAINS LEAD ARE COLOURED IN ACCORDANCE WITH THE FOLLOWING CODE:

GREEN-AND-YELLOW	: EARTH
BLUE	: NEUTRAL
BROWN	: LIVE

APPEARANCE VIEW

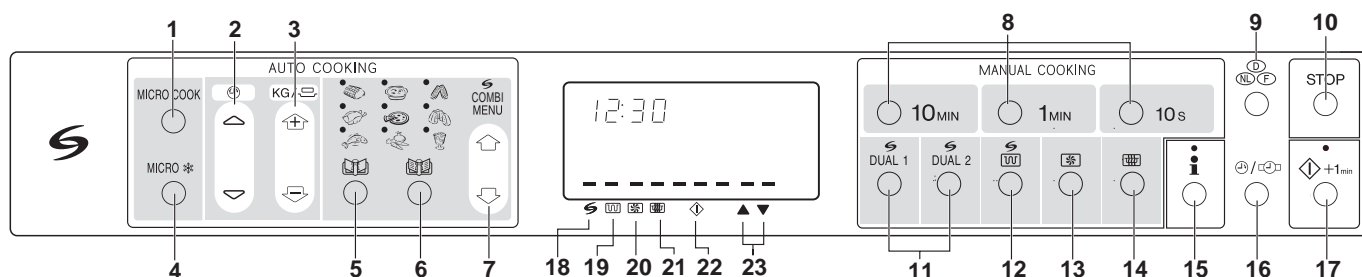
OVEN



1. Control panel
2. Waveguide cover (DO NOT REMOVE)
3. Oven lamp
4. Oven cavity
5. Coupling
6. Door latches
7. Door opening handle
(To open the door, pull the handle down and forward.
Never hold the door handle when moving the oven.)
8. Door seals and sealing surfaces
9. Ventilation cover (DO NOT REMOVE)
10. Outer cabinet

11. Power cord
12. Air-vent openings
13. Turntable
14. Turntable support
15. Low rack
16. High rack
17. Splash guard

CONTROL PANEL



Operating keys:

- 1 MICRO COOK key
By pressing this key you can select the MICRO COOK menu.
- 2 LESS/MORE keys
- 3 WEIGHT keys
- 4 MICRO DEFROST key
By pressing this key you can select the MICRO DEFROST menu.
- 5 BASIC COOK key
- 6 RECIPES key
- 7 COMBI MENU keys
For selecting the menu of BASIC COOK and RECIPES.

- 8 TIME keys
- 9 LANGUAGE key
- 10 STOP key
- 11 DUAL MODE keys
There are two Dual modes:
Dual 1: Microwave and Grill with high speed air circulation.
Dual 2: Microwave and Convection with high speed air circulation.
- 12 GRILL key
- 13 CONVECTION key
By pressing this key you can adjust the convection temperature.

- 14 MICROWAVE POWER LEVEL key
By pressing this key you can adjust the Microwave power level.
- 15 INFO key
- 16 TIMER/CLOCK SETTING key
- 17 \diamond (START)+1min key

Digital display and indicators:

- 18 HIGH SPEED indicator
- 19 GRILL indicator
- 20 CONVECTION indicator
- 21 MICROWAVE indicator
- 22 COOKING IN PROGRESS indicator
- 23 MORE/LESS indicator

NOTE:

Some one-touch cooking features such as " \diamond (START)+1min" are disabled after three minutes when the oven is not in use. These features are automatically enabled when the door is opened and closed or the STOP key is pressed.

OPERATION

DESCRIPTION OF OPERATING SEQUENCE

The following is a description of component functions during oven operation.

OFF CONDITION

Closing the door activates the door sensing switch SW4 and secondary interlock switch SW1 and 3rd. latch switch SW3. (In this condition, the monitor switch SW2 contacts are opened.)

IMPORTANT:

When the oven door is closed, the contacts COM-NC of the monitor switch SW2 must be open. When the microwave oven is plugged in a wall outlet (230V / 50Hz), the line voltage is supplied to the noise filter.

Figure O-1 on page 37

1. The display will show "SELECT LANGUAGE" in 3 languages.

To set any program or set the clock, you must first touch the STOP key. The display will clear, and " . 0 " will appear.

NOTE: When the door is opened, the oven lamp comes on. Once you select the language using the LANGUAGE key, the display will show "PRESS STOP" when you plug the oven in.

2. A signal is input to the control unit, energizing the coil of shut-off relay (RY-4). RY4 contacts close, completing a circuit to the damper motor. The damper motor now operates moving the damper to the open position, thereby closing the contacts of the damper switch SW5 inputs a signal to the control unit. The coil of relay RY-4 is de-energized, opening its contacts, thereby turning off the damper motor.

MICROWAVE COOKING CONDITION

HIGH COOKING

Program desired cooking time by touching the TIME keys. When the \Diamond (START)+1min key is touched, the following operations occur:

1. The contacts of relays are closed and components connected to the relays are turned on as follows. (For details, refer to Figure O-2)

RELAY	CONNECTED COMPONENTS
RY-1	Oven lamp/Turntable motor
RY-2	High voltage transformer
RY-3	Convection motor
RY-4	Damper motor
RY-5	Fan motor
RY-6	Convection motor
SSR1	Top heating element
SSR2	Side heating element

2. The line voltage is supplied to the primary winding of the high voltage transformer. The voltage is converted to about 3.3 volts A.C. output on the filament winding and high voltage of approximately 2000 volts A.C. on the secondary winding.
3. The filament winding voltage (3.3 volts) heats the magnetron filament and the high voltage (2000 volts) is sent to the voltage doubling circuit, where it is doubled

to negative voltage of approximately 4000 volts D.C..

4. The 2450 MHz microwave energy produced in the magnetron generates a wavelength of 12.24 cm. This energy is channelled through the waveguide (transport channel) into the oven cavity, where the food is placed to be cooked.
5. When the cooking time is up, a signal tone is heard and the relays RY1 + RY2 + RY5 go back to their home position. The circuits to the oven lamp, high voltage transformer, fan motor and turntable motor are cut off.
6. When the oven door is opened during a cooking cycle, the switches come to the following condition.

Switch	Contact	Condition	
		During Cooking	Oven Door Open(No cooking)
Secondary interlock switch	COM-NO	Closed	Opened
Door sensing switch SW4	COM-NO	Closed	Opened
3rd. latch switch SW3	COM-NO	Closed	Opened
Monitor switch SW2	COM-NC	Opened	Closed

The circuit to the high voltage transformer is cut off when the contacts of relay RY2, and the contacts (COM-NO) of the secondary interlock switch SW1 are made open. The circuit to the fan motor is cut off when the relay RY5 is made open. The circuit to the turntable motor is cut off when the contacts (COM-NO) of the secondary interlock switch SW1 are made open. The oven lamp remains on even if the oven door is opened after the cooking cycle has been interrupted, because the relay RY1 stays closed. Shown in the display is remaining time.

7. MONITOR SWITCH CIRCUIT

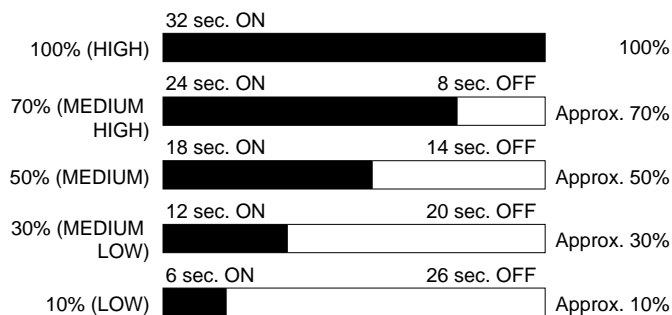
The monitor switch SW2 is mechanically controlled by the oven door, and monitors the operation of the secondary interlock switch SW1 and the relay RY2.

- 7-1. When the oven door is opened during or after the cycle of a cooking program, the secondary interlock switch SW1 and the door sensing switch SW4 must open their contacts (COM-NO) first. After that the contacts (COM-NC) of the monitor switch SW2 can be closed and the contacts (COM-NO) of 3rd. latch switch SW3 are made open.
- 7-2. When the oven door is closed, the contacts (COM-NC) of the monitor switch SW2 must be opened and the contacts (COM-NO) of 3rd. latch switch SW3 must be closed. After that the contacts (COM-NO) of the secondary interlock switch SW1 and the door sensing switch SW4 are made closed.
- 7-3. When the oven door is opened and the contacts (COM-NO) of the secondary interlock switch SW1 remain closed, the fuse F2 F10A will blow. Because the relay RY2 and monitor switch SW2 are closed and a short circuit is caused.

MEDIUM HIGH, MEDIUM, MEDIUM LOW, LOW COOKING

When the microwave oven is preset for variable cooking power, the line voltage is supplied to the high voltage transformer intermittently within a 32-second time base through the relay contact which is coupled with the cur-

rent-limiting relay RY2. The following levels of microwave power are given.



NOTE: The ON/OFF time ratio does not correspond with the percentage of microwave power, because approx. 3 seconds are needed for heating of the magnetron filament.

CONVECTION COOKING CONDITION

PREHEATING CONDITION

Program desired convection temperature by touching the CONVECTION key. When the \diamond (START)+1min key is touched, the following operations occur: (Figure O-3)

1. The coil of shut-off relays (RY1, RY3 and RY5) are energized, the oven lamp, cooling fan motor, turntable motor and convection motor are turned on. The contacts (COM-NO) of relay RY6 are opened.
2. The coil of relay (RY4) is energized by the control unit. The damper is moved to the closed position, closing the damper switch SW5 contacts. The closing of the damper switch SW5 contacts sends a signal to the LSI on the control unit de-energizing the relay (RY4) and opening the circuit to the damper motor.
3. The solid-state relays (SSR1+SSR2) are energized by the control unit and the main supply voltage is applied to the top and side heating elements.
4. When the oven temperature reaches the selected preheat temperature, the following operations occur:
 - 4-1. The solid-state relays (SSR1+SSR2) are de-energized by the control unit temperature circuit and thermistor, opening the circuit to the heating elements.
 - 4-2. The oven will continue to function for 30 minutes, turning the heating elements on and off, as needed to maintain the selected preheat temperature. The oven will shutdown completely after 30 minutes

CONVECTION COOKING CONDITION

Enter the cooking time by touching TIME keys and select the temperature by touching CONVECTION key. When the \diamond (START)+1min key is touched, the following operations occur:

Figure O-3 on page 38

1. The numbers on the digital read-out start to count down to zero.
2. The oven lamp, turntable motor, cooling fan motor and convection motor are energized. The contacts (COM-NO) of relay RY6 are opened.
3. The damper is moved to the closed position.
4. The solid-state relays (SSR1+SSR2) are energized (if the cavity temperature is lower than the selected temperature) and the main supply voltage is applied to the heating elements to return to the selected cooking temperature.

5. Upon completion of the cooking time, the audible signal will sound, and oven lamp, turntable motor, cooling fan motor and convection motor are de-energized. At the end of the convection cycle, if the cavity air temperature is above 111°C, the circuit to RY5 will be maintained (by the thermistor circuit) to continue operation of the cooling fan motor until the temperature drops below 90°C, at which time the relay will be de-energized, turning off the fan motor. Relay RY3 will however, open as soon as the convection cycle has ended, turning off the convection fan motor.
6. At the end of the convection cook cycle, if the cavity air temperature is below 120°C, shut-off relay (RY4) is energized turning on the damper motor. The damper is returned to the open position, closing the damper switch SW5 contacts which send a signal to the control unit, de-energizing shut-off relay (RY4).

GRILL COOKING

Enter cooking time and then touch the GRILL key. When the \diamond (START)+1min key is touched, following operations occur;

Figure O-4 on page 38

1. The contacts of the relays RY1, RY3 and RY5 are closed, and the oven lamp, turntable motor, convection motor and fan motors are energized. The contacts (COM-NO) of relay RY6 are closed.

NOTE :The rotate direction of the convection motor is reverse to one of the convection cooking by the relay RY6.

2. The damper is moved to the closed position.
3. The solid-state relays (SSR1+SSR2) are energized and the main supply voltage is applied to the top and side heating elements.

NOTE :After cooking, the operation of the fan motors, damper motor is the same as one of the convection cooking.

DUAL1 COOKING

Enter cooking time and then touch DUAL1 key. When the \diamond (START)+1min key is touched, following operations occur;

Figure O-5 on page 39

1. The contacts of the relays RY1, RY3 and RY5 are closed, and the oven lamp, turntable motor, convection motor and fan motors are energized. The contacts (COM-NO) of relay RY6 are closed.

NOTE :The rotate direction of the convection motor is revers to one of the convection cooking.

2. The damper is moved to the closed position.
3. The solid-state relays (SSR1+SSR2) are energized and the main supply voltage is applied to the top and side heating elements.
4. The relay RY2 is energized and the microwave energy is generated by magnetron.

NOTE: After cooking, the operation of the fan motors, damper motor is the same as one of the convection cooking.

DUAL2 COOKING

Enter cooking time and then touch DUAL2 key. When the \diamond (START)+1min key is touched, following operations occur;

Figure O-6 on page 39

1. The contacts of the relays RY1, RY3 and RY5 are closed, and the oven lamp, turntable motor, convection motor and fan motors are energized. The contacts

(COM-NO) of relay RY6 are opened.

- The damper is moved to the closed position.
- The solid-state relays (SSR1+SSR2) and relay RY2 are energized, and the main supply voltage is applied to the top and side heating elements and the high voltage transformer alternately.

NOTE: After cooking, the operation of the fan motors, damper motor is the same as one of the convection cooking.

AUTOMATIC COOKING

Automatic cooking will automatically compute the oven temperature, microwave power and cooking time. And the oven will cook according to the special cooking sequence.

POWER CONTROL FOR MANUAL COOKING

Following table shows the power control for manual cooking.

Manual MENU		Air Balancel	Micro %	Micro ON Side heaer %	Micro. OFF		Oven temperature	Powr down time	Power after powr down time			
					Top heaer %	Side heater %			Micro.	Micro.ON Side heaer	Micro.OFF Top heaer Side heaer	
MICROWAVE		-	10, 30, 50 70, 100	-	-	-	-	40 min.	70%	-	-	-
GRILL		Jet	-	-	100	100	220°C	30 min.	-	-	50%	0%
DUAL1		Jet	70	70	30	30	220°C	All 20 min.	50%	0%	50%	0%
			50	50	50	50			50%			
			30	30	70	70			30%			
			10	10	90	90			10%			
DUAL2	220 - 250°C	Conv.	70	70	30	30	220 - 250°C	All 20 min.	50%	0%	30%	20%
			50	50	50	50			50%			
			30	30	70	70			30%			
			10	10	70	90			10%			
	190°C - 200°C	Conv.	70	70	0	0	190°C - 200°C	35 min.	50%	0%	30%	20%
			50	50	0	50		20 min.	50%			
			30	30	70	70			30%			
			10	10	70	90			10%			
	180°C	Conv.	70	70	0	0	180°C	45 min.	50%	0%	30%	20%
			50	50	0	50		30 min.	50%			
			30	30	70	70			30%			
			10	10	70	90			10%			
	40 - 160°C	Conv.	70	0	20	20	40 - 160°C	No	-	-	-	-
			50	0	20	20			-			
			30	0	20	20			-			
			10	0	20	20			-			
REHAET		Conv. or Jet	-	-	100	100	40 - 250°C		-	-	-	-
CONV.	Cool oven (Oven Temperature less than 59°C)	Conv.	-	-	50	60	40 - 200°C	20 min.	-	-	20%	20%
			-	-	50	60	220 - 230°C	30 min.	-	-	30%	30%
			-	-	60	70	250°C	30 min.	-	-	30%	30%
	Warm oven (Oven Temperature 60°C - 99°C)	Conv.	-	-	40	40	40 - 200°C	20 min.	-	-	30%	30%
			-	-	40	50	220 - 230°C	30 min.	-	-	30%	30%
			-	-	50	60	250°C	30 min.	-	-	30%	30%
	After preheating (Oven Temperature more than 100°C)	Conv.	-	-	30	30	40 - 200°C	No	-	-	-	-
			-	-	30	40	220 - 230°C	30 min.	-	-	30%	30%
			-	-	40	50	250°C	30 min.	-	-	30%	30%

FIRE SENSING FEATURE (MICROWAVE MODE)

This model incorporates a sensing feature which will stop the oven's operation if there is a fire in the oven cavity during microwave cooking. This fire sensing feature will operate when the microwave power level is set to 80% or more. This is accomplished by the LSI repeatedly measuring the voltage across the temperature measurement circuit (thermistor) during its 32-seconds time base comparing the obtained voltage measurements. If the most recent voltage measured is 300 mV greater than the previous voltage measured, the LSI judges it as a fire in the oven cavity and switches off the relays to the power transformer, fan motor and convection motor. The LSI also stops counting down and closes the damper door so that no fresh air will enter the oven cavity. Please refer to the following section for a more detailed description.

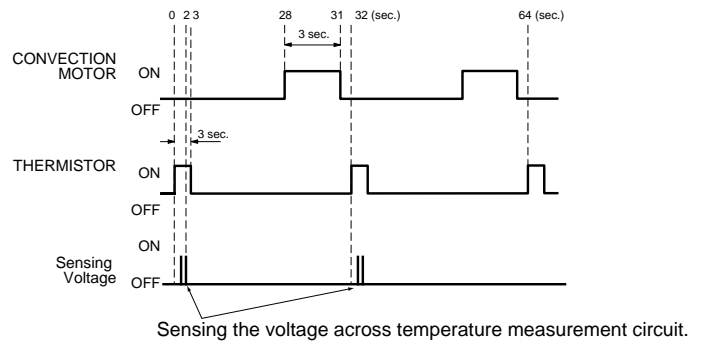
Operation

Please refer to the timing diagrams below.

- The fire sensing will start after 30 minutes when the oven is started.
- The thermistor operates within a 32-seconds time base and it is energized for three (3) seconds and off for 29 seconds. Two (2) seconds after the thermistor is energized, the voltage across the temperature measurement circuit is sampled by the LSI and twenty five (25) seconds after the thermistor is cut off the LSI turns on the convection fan for three (3) seconds.
- The above procedure is repeated. If the difference between the first voltage measured (in step 1) and the voltage measured when the procedure is repeated (step 2) is greater than 300 mV the LSI makes the judgment that there is a fire in the oven cavity and will switch off the relays to the power transformer, fan motor and convection motor.

The LSI also stops counting down and closes the damper door so that no fresh air will enter the oven cavity.

- Once the fire sensor feature has shut the unit down, the programmed cooking cycle may be resumed by pressing the "START" pad or the unit may be reset by pressing the "CLEAR" pad.



FUNCTION OF IMPORTANT COMPONENTS

DOOR OPEN MECHANISM

The door is opened by pulling the door handle down and forward, referring to the figure D-1. When the door handle is pulled down, the latch heads are moved upward. And then when the door handle is pulled forward, the latch heads are released from the latch hooks right and left. Now, the door will open.

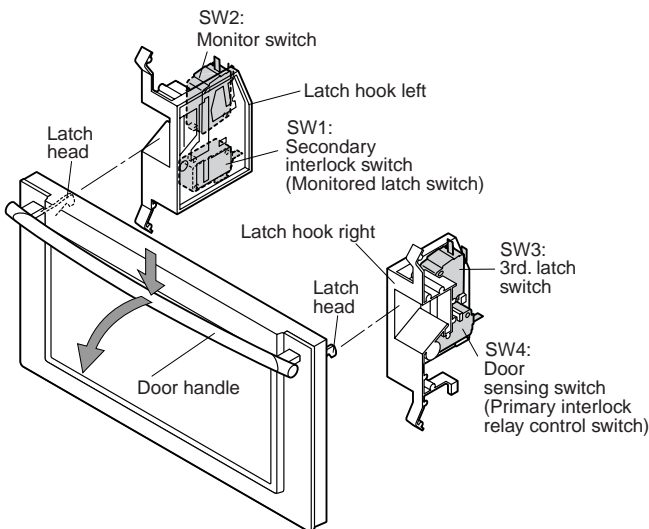


Figure D-1. Door Open Mechanism

DOOR SENSING SWITCH SW4, SECONDARY INTERLOCK SWITCH SW1 AND 3RD. LATCH SWITCH SW3

- When the oven door is closed, the contacts (COM-NO) must be closed.
- When the oven door is opened, the contacts (COM-NO) must be opened.

MONITOR SWITCH SW2

- When the oven door is closed, the contacts (COM-NC) must be opened.
- When the oven door is opened, the contacts (COM-

NC) must be closed.

- If the oven door is opened and the contacts (COM-NO) of the secondary interlock switch SW1 and the relay RY2 fail to open, the fuse F10A blows simultaneously with closing the contacts (COM-NC) of the monitor switch SW2.

CAUTION: BEFORE REPLACING A FUSE TEST THE SECONDARY INTERLOCK SWITCH SW1, RELAY RY2 AND MONITOR SWITCH SW2 FOR PROPER OPERATION. (REFER TO CHAPTER "TEST PROCEDURE".)

FUSE F2 (F10A)

- The fuse F2 (F10A) blows when the contacts (COM-NO) of the secondary interlock switch SW1 and relay RY2 remain closed with the oven door open and when the monitor switch closes.
- If the wire harness or electrical components are short-circuited, the fuse F2 (F10A) blows to prevent an electric shock or fire hazard.

HIGH VOLTAGE FUSE F3

The high voltage fuse F3 blows when the high voltage rectifier or the magnetron is shorted.

NOISE FILTER

The noise filter prevents the radio frequency interference that might flow back in the power circuit.

THERMISTOR

The thermistor is a negative temperature coefficient type. The temperature in the oven cavity is detected through the resistance of the thermistor, and then the control unit causes the heater relay to operate, thus the current to the heating elements is turned ON/OFF. If the convection cooking or some cooking modes which use the top / side heating elements is started and the oven temperature does not rise above 37.8°C, the control unit will stop the oven after 10 minutes. In this case, the thermistor may be opened.

MAGNETRON TEMPERATURE FUSE TF

The temperature fuse located on the waveguide flange is designed to prevent damage to the magnetron if an over heated condition develops in the magnetron due to cooling fan failure, obstructed air guide, dirty or blocked air intake, etc. Under normal operation, the temperature fuse remains closed. However, when abnormally high temperatures are reached within the magnetron, the temperature fuse will open at 150°C causing the oven to shut down.

TOP HEATER THERMAL CUT-OUT TC1

The thermal cut-out located on the thermal cover upper is designed to prevent damage to the top heating element unit if an over heated condition develops in the top heating element unit due to convection fan failure, thermistor failure, obstructed air ducts, dirty or blocked air intake, etc. Under normal operation, the thermal cut-out remains closed. However, when abnormally high temperature are reached within the top heating element unit, the thermal cut-out will open at 170°C causing the oven to shut down. When the thermal cut-out has cooled, the thermal cut-out closes at 155°C.

SIDE HEATER THERMAL CUT-OUT TC2

The thermal cut-out located on the thermal cover left is designed to prevent damage to the side heating element unit if an over heated condition develops in the top heating element unit due to convection fan failure, thermistor failure, obstructed air ducts, dirty or blocked air intake, etc. Under normal operation, the thermal cut-out remains closed. However, when abnormally high temperature are reached within the side heating element unit, the thermal cut-out will open at 150°C causing the oven to shut down. When the thermal cut-out has cooled, the thermal cut-out closes at 130°C.

TOP HEATING ELEMENT H1

The top heating element is located at the top of the oven cavity. It is intended to heat air driven by the convection fan. The heated air is kept in the oven and force-circulated and reheated by the top heating element.

SIDE HEATING ELEMENT H2

The side heating element is located at the left side of the oven cavity. It is intended to heat air driven by the convection fan. The heated air is kept in the oven and force-circulated and reheated by the top heating element.

TURNTABLE MOTOR TTM

The turntable motor rotates the turntable located in the bottom of the oven cavity, so that the food on the turntable is cooked evenly during cooking. The turntable may turn in either direction.

FAN MOTOR (MAGNETRON SIDE) FM

The fan motor drives a blade which draws external cool air. This cool air is directed through the air vents surrounding the magnetron and cools the magnetron. This air is channelled through the oven cavity to remove steam and vapors given off from the heating foods. It is then exhausted through the exhausting air vents at the oven cavity.

FAN MOTOR (HIGH VOLTAGE TRANSFORMER SIDE) FM

The fan motor drives a blade which draws external cool air. This cool air is directed through the air vents surrounding the power transformer and cools the power transformer. This air is channelled through the oven cavity to remove steam and vapors given off from the heating foods. It is then exhausted through the exhausting air vents at the oven cavity.

CONVECTION COOKING SYSTEM

This oven is designed with a hot air heating system where food is not directly heated by the heating element, but is heated by forced circulation of the hot air produced by the heating elements. The air heated by the heating elements is circulated through the convection passage provided on the outer casing of the oven cavity by means of the convection fan which is driven by the convection motor CM. It then enters the inside of the oven through the vent holes provided on the top and left sides of the oven. Next, the hot air heats the food on the turntable and leaves the oven cavity through the vent in the center of the oven cavity back side wall. Without leaving the oven, this hot air is reheated by the heating elements, passes through the convection passage and enters the inside of the oven cavity again, in a continuing cycle. In this way, the hot air circulates inside the oven cavity to raise its temperature and, at the same time, comes into contact with the food being cooked. When the temperature inside the oven cavity reaches the selected temperature, the heating elements are de-energized. When the temperature inside the oven cavity drops below the selected temperature, the heating elements are energized again. In this way, the inside of the oven cavity is maintained at approximately the selected temperature. When the convection time reaches 0, the heating elements are de-energized and the convection fan stops operating and the oven shuts off.

Flow of hot air:

The rotation direction of the convection motor CM is controlled by relay RY6. When the convection fan rotates clockwise, the hot air from the oven cavity left side wall blows stronger than one from the oven cavity top wall. (This mode is called "Convection mode".) When the convection fan rotates counterclockwise, the hot air from the oven cavity top wall blows stronger than one from the oven cavity left side wall. (This mode is called "JET mode".)

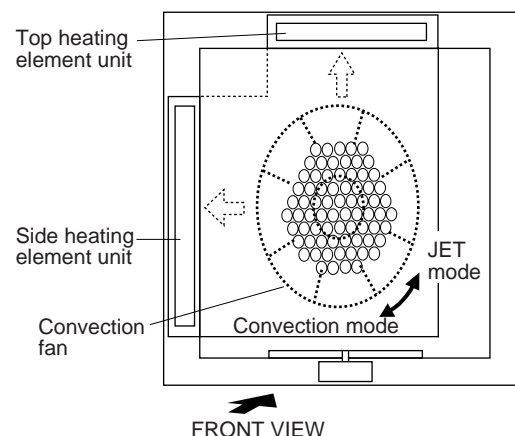


Figure D-2. Rotation direction of convection fan

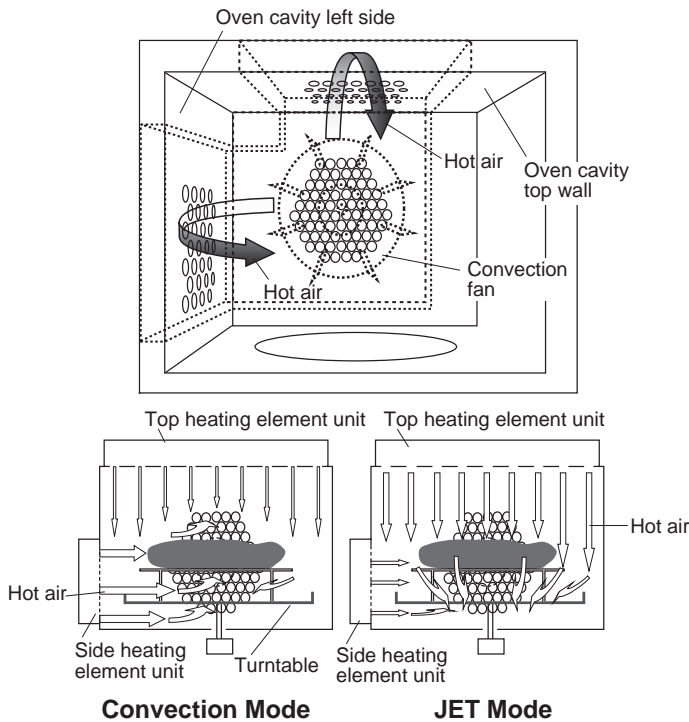


Figure D-3. Flow of hot air

DAMPER OPEN-CLOSE MECHANISM

Usually, the damper is in the open position except during convection cooking, preheat, grill, dual1, dual2 or all cooking modes which use the top / side heating elements. Damper position is set automatically by damper motor DM, damper switch SW5, motor cam and damper shaft. These components are operated by a signal that judges if microwave cooking, convection cooking operation or other cooking operation is selected by the control unit.

Microwave Cooking:

Damper is in the open position, because a portion of cooling air is channelled through the cavity to remove steam and vapors given off from the heating foods. It is then exhausted

at the top of the oven cavity into a condensation compartment.

Convection, Preheat, Grill, Dual1, Dual2, or all cooking modes which use the top / side heating elements: Damper is in the closed position, so that no hot air will be allowed to leak out the oven cavity.

Damper Operation

1. When power supply cord is plugged in:
 - 1-1. When power supply cord is plugged in, a signal is sensed in the control unit, and operates shut-off relay (RY4).
 - 1-2. Contacts of shut-off relay (RY4) close, the damper motor DM is energized, opening the damper door.
 - 1-3. When the damper is moved to the open position by the damper cam the damper switch SW5 is opened (OFF position).
 - 1-4. The signal from damper switch SW5 is re-sensed in the control unit and shut-off relay (RY4) is turned off.
 - 1-5. The rated voltage to the damper motor DM is removed and the motor turns off.
2. When oven is microwave cooking:

Damper is in the open position.
3. When oven is convection cooking:
 - 3-1. Damper motor is energized by touching the CONVECTION and \diamond (START)+1min keys.
 - 3-2. When damper is in the closed position (damper switch SW5 is ON), its signal is sensed by the control unit, and shut-off relay (RY4) is de-energized.
 - 3-3. The damper is held in the closed position during the convection cooking operation.
 - 3-4. At the end of the convection cooking, if the cavity air temperature is below 121°C, shut-off relay (RY4) is energized, and the damper is returned to the open position.

NOTE: If the damper door is not in the proper position, closed during convection or open during microwave, the control unit will stop oven operation after 1 minute.

TROUBLESHOOTING GUIDE

When troubleshooting the microwave oven, it is helpful to follow the Sequence of Operation in performing the checks. Many of the possible causes of trouble will require that a specific test be performed. These tests are given a procedure letter which will be found in the "Test Procedure" section.

IMPORTANT: If the oven becomes inoperative because of a blown fuse F2 (F10A) in the secondary interlock switch SW1 - monitor switch SW2- primary interlock relay RY2 circuit, check the monitor switch SW2, relay (RY1), primary interlock relay (RY2) and secondary interlock switch SW1 before replacing the fuse F2 (F10A).

TEST PROCEDURE	CONDITION	OFF CONDITION					COOKING CONDITION				(MICROWAVE)				(CONVECTION/GRILL/ DUAL)				
	PROBLEM POSSIBLE CAUSE AND DEFECTIVE PARTS	Home fuse blows when power cord is plugged into wall receptacle.	Fuse F1 20A blows when power cord is plugged into wall receptacle	"SELECT LANGUAGE" does not appear in display when power cord is first plugged into wall receptacle.	Display does not operate properly when STOP key is touched. (The time of day should appear on the display with beep sound.)	Oven lamp does not light with door opened.	Oven lamp does not light in cook cycle. (It light when door is opened).	Cooking cycle runs 1 minute then shuts down.	Oven lamp light, but turntable motor does not operate.	Turntable motor operates normally but cooling fan motor does not operate.	Oven does not go into a cook cycle, when ⬠(START)+1min key is touched.	Low or no power is produced during microwave cooking (The food is heated incompletely or not heated at all)	Extremely uneven heating is produced in oven load (food).	Function of variable cooking does not operate properly except HIGH (100%) power.	Oven does not go into cook cycle when ⬠(START)+1min is touched.	Heating elements do not heat.	Temperature in the oven cavity is lower or higher than preset.	Convection cycle runs for 10 minutes then shuts down.	Convection motor does not operate of all or properly.
A	MAGNETRON											○							
B	HIGH VOLTAGE TRANSFORMER											○							
C	H.V. RECTIFIER ASSEMBLY											○							
D	HIGH VOLTAGE CAPACITOR C1											○							
E	SECONDARY INTERLOCK SWITCH SW1										○				○	○			
E	3RD. LATCH SWITCH SW3															○			
E	DOOR SENSING SWITCH SW4				○	○					○				○				
E	MONITOR SWITCH SW2																		
F	HIGH VOLTAGE FUSE F3											○							
G	NOISE FILTER		○	○															
H	FUSE F1 20A			○															
J	MAGNETRON TEMPERATURE FUSE			○															
K	THERMAL CUT-OUT (TOP) TC1			○															
M	TOP HEATING ELEMENT H1															○	○		
O	THERMISTOR																○	○	
P/U	DAMPER MOTOR								○										
Q	DAMPER SWITCH SW5								○										
V	TOUCH CONTROL PANEL			○	○	○	○	○		○	○	○		○	○	○	○	○	○
W	TACT SWITCH				○						○			○	○				
X	RELAY RY-1					○	○				○								
X	RELAY RY-2											○		○					
X	RELAY RY-3																○		○
X	RELAY RY-4							○											
X	RELAY RY-5								○										
X	RELAY RY-6									○									○
Z	FUSE1 ON PWB.			○															
Y	SOLID-STATE RELAY (TOP) SSR1															○	○		
Y	SOLID-STATE RELAY (SIDE) SSR2															○	○		
Replace	OVEN LAMP					○													
U	FAN MOTOR (MAGNETRON)									○									
U	TURNTABLE MOTOR								○				○						
S	CONVECTION MOTOR																○		○
Check	LOOSE WIRING		○	○	○	○		○	○	○	○	○	○		○	○	○	○	○
Check	SHORTED IN POWER CORD	○																	
Check	NO POWER AT OUTLET			○															
Check	LOW VOLTAGE			○													○		
L	THERMAL CUT OUT (SIDE) TC2			○															
N	SIDE HEATING ELEMENT H2															○	○		
U	FAN MOTOR (HIGH VOLTAGE TRANSFORMER)									○									
Z	T/C TRANSFORMER			○															
I	FUSE F2 F10A											○							
R	CONVECTION MOTOR CAPACITOR C2																○		○
Check	MISADJUSTMENT SWITCH				○	○					○	○			○	○			

TEST PROCEDURES

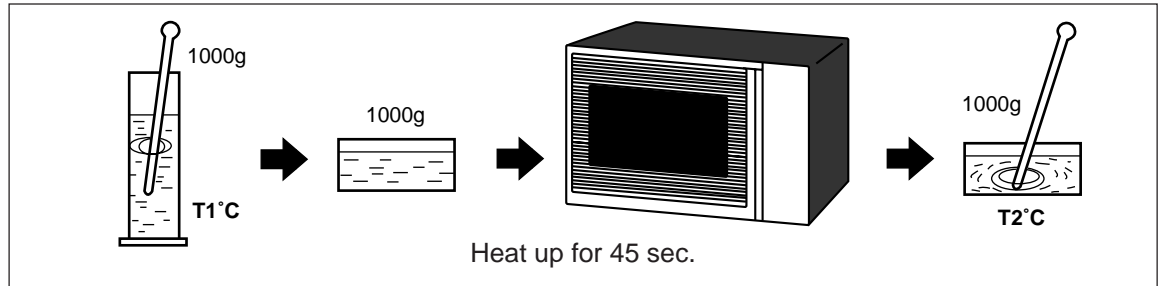
PROCEDURE LETTER	COMPONENT TEST								
A	MAGNETRON ASSEMBLY TEST <div> <p>NEVER TOUCH ANY PART IN THE CIRCUIT WITH YOUR HAND OR AN INSULATED TOOL WHILE THE OVEN IS IN OPERATION.</p> <ol style="list-style-type: none"> 1. CARRY OUT 3D CHECKS. 2. Remove the back plate from the oven, referring to "BACK PLATE REMOVAL". 3. To test for an open filament, isolate the magnetron from the high voltage circuit. A continuity check across the magnetron filament leads should indicate less than 1 ohm. 4. To test for a shorted magnetron, connect the ohmmeter leads between the magnetron filament leads and chassis ground. This test should indicate an infinite resistance. If there is little or no resistance the magnetron is grounded and must be replaced. 5. Reconnect all leads removed from components during testing. 6. Reinstall the outer case (cabinet) and the back plate. 7. Reconnect the power supply cord after the outer case and back plate are installed. 8. Run the oven and check all functions. <p>MICROWAVE OUTPUT POWER (IEC60705)</p> <p>The following test procedure should be carried out with the microwave oven in a fully assembled condition (outer case fitted). Microwave output power from the magnetron can be measured by IEC 60705, i.e. it can be measured by using water load how much it can be absorbed by the water load. To measure the microwave output power in the microwave oven, the relation of calorie and watt is used. When P(W) heating works for t(second), approximately $P \times t / 4.187$ calorie is generated. On the other hand, if the temperature of the water with V(ml) rises ΔT (°C) during this microwave heating period, the calorie of the water is $V \times \Delta T$.</p> <div> <p>The formula is as follows;</p> $P \times t / 4.187 = V \times \Delta T + 0.55 \times mc (T_2 - T_0) / 4.187 \quad P (W) = 4.187 \times V \times \Delta T / t + 0.55 \times mc (T_2 - T_0) / t$ <p>Our condition for water load is as follows:</p> <table> <tr> <td>Room temperature (T0) ... around 20°C</td><td>Power supply Voltage Rated voltage</td></tr> <tr> <td>Water load 1000 g</td><td>Initial temperature (T1) 10±1°C</td></tr> <tr> <td>Heating time 42 sec.</td><td>Mass of container (mc) 330 g</td></tr> <tr> <td>T2 Final Temperature</td><td>$P = 100 \times \Delta T + 0.55 \times mc (T_2 - T_0) / 42$</td></tr> </table> </div> </div> <p>Measuring condition:</p> <ol style="list-style-type: none"> 1. Container The water container must be a cylindrical borosilicate glass vessel having a maximum material thickness of 3 mm and an outside diameter of approximately 190 mm. 2. Temperature of the oven and vessel The oven and the empty vessel are at ambient temperature prior to the start of the test. 3. Temperature of the water The initial temperature of the water is (10±1)°C. 4. Select the initial and final water temperature so that the maximum difference between the final water temperature and the ambient temperature is 5°C. 5. Select stirring devices and measuring instruments in order to minimize addition or removal of heat. 6. The graduation of the thermometer must be scaled by 0.1°C at minimum and an accurate thermometer. 7. The water load must be (1000±5) g. 8. "t" is measured while the microwave generator is operating at full power. Magnetron filament heat-up time is not included. <p>NOTE: The operation time of the microwave oven is "t + 3" sec. 3 sec. is magnetron filament heat-up time.</p> <p>Measuring method:</p> <ol style="list-style-type: none"> 1. Measure the initial temperature of the water before the water is added to the vessel. (Example: The initial temperature T1 = 11°C) 2. Add the 1 litre water to the vessel. 3. Place the load on the centre of the shelf. 4. Operate the microwave oven at HIGH for the temperature of the water rises by a value ΔT of 10 °C. 5. Stir the water to equalize temperature throughout the vessel. 6. Measure the final water temperature. (Example: The final temperature T2 = 21°C) 7. Calculate the microwave power output P in watts from above formula. 	Room temperature (T0) ... around 20°C	Power supply Voltage Rated voltage	Water load 1000 g	Initial temperature (T1) 10±1°C	Heating time 42 sec.	Mass of container (mc) 330 g	T2 Final Temperature	$P = 100 \times \Delta T + 0.55 \times mc (T_2 - T_0) / 42$
Room temperature (T0) ... around 20°C	Power supply Voltage Rated voltage								
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Heating time 42 sec.	Mass of container (mc) 330 g								
T2 Final Temperature	$P = 100 \times \Delta T + 0.55 \times mc (T_2 - T_0) / 42$								

TEST PROCEDURES

PROCEDURE LETTER	COMPONENT TEST
	Room temperature $T_o = 21^{\circ}\text{C}$ Initial temperature $T_1 = 11^{\circ}\text{C}$ Temperature after $(42 + 3) = 45$ sec. $T_2 = 21^{\circ}\text{C}$ Temperature difference Cold-Warm $\Delta T_1 = 10^{\circ}\text{C}$ Measured output power The equation is " $P = 100 \times \Delta T$ " $P = 100 \times 10^{\circ}\text{C} = 1000$ Watts

JUDGEMENT: The measured output power should be at least $\pm 15\%$ of the rated output power.

CAUTION: 1°C CORRESPONDS TO 100 WATTS. REPEAT MEASUREMENT IF THE POWER IS INSUFFICIENT.



B HIGH VOLTAGE TRANSFORMER TEST

WARNING: High voltage and large currents are present at the secondary winding and filament winding of the high voltage transformer. It is very dangerous to work near this part when the oven is on. **NEVER** make any voltage measurements of the high-voltage circuits, including the magnetron filament.

1. CARRY OUT 3D CHECKS.
2. Remove the back plate from the oven, referring to "BACK PLATE REMOVAL".
3. Disconnect the leads to the primary winding of the high voltage transformer. Disconnect the filament and secondary winding connections from the rest of the HV circuitry. Using an ohmmeter, set on a low range, it is possible to check the continuity of all three winding. The following readings should be obtained:-
 - a. Primary winding 1.2 ohms approximately
 - b. Secondary winding 95 ohms approximately
 - c. Filament winding less than 1 ohm

If the readings obtained are not stated as above, then the high voltage transformer is probably faulty and should be replaced.
4. Also, the high voltage transformer has the thermostat in the primary coil. Measure the resistance of the primary coil. The resistance of the primary coil should be above resistance unless the temperature of the thermostat in the primary coil reaches approximately 160°C . The thermostat resets automatically at 105°C . If an ohmmeter indicates an open circuit under normal condition, replace the high voltage transformer because the primary coil (thermostat) has opened. An open primary coil (thermostat) indicates overheating of the high voltage transformer. Check for restricted air flow to the high voltage transformer, especially the fan motor (high voltage transformer side).
5. CARRY OUT 4R CHECKS.

C HIGH VOLTAGE RECTIFIER TEST

1. CARRY OUT 3D CHECKS.
2. Remove the back plate from the oven, referring to "BACK PLATE REMOVAL".
3. Isolate the high voltage rectifier assembly from the HV circuit. The high voltage rectifier can be tested using an ohmmeter set to its highest range. Connect the ohmmeter across the terminal of the high voltage rectifier and note the reading obtained. Reverse the meter leads and note this second reading. The normal resistance is infinite in one direction and more than $100\text{ k}\Omega$ in the other direction.
4. CARRY OUT 4R CHECKS.

TEST PROCEDURES

PROCEDURE
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COMPONENT TEST

NOTE: FOR MEASUREMENT OF THE RESISTANCE OF THE RECTIFIER, THE BATTERIES OF THE MEASURING INSTRUMENT MUST HAVE A VOLTAGE AT LEAST 6 VOLTS, BECAUSE OTHERWISE AN INFINITE RESISTANCE MIGHT BE SHOWN IN BOTH DIRECTIONS.

D HIGH VOLTAGE CAPACITOR C1 TEST

1. CARRY OUT 3D CHECKS.
2. Remove the back plate from the oven, referring to "BACK PLATE REMOVAL".
3. Isolate the high voltage capacitor from the circuit.
4. Continuity check must be carried out with measuring instrument which is set to the highest resistance range.
5. A normal capacitor shows continuity for a short time (kick) and then a resistance of about 10M Ω after it has been charged.
6. A short-circuited capacitor shows continuity all the time.
7. An open capacitor constantly shows a resistance about 10 M Ω because of its internal 10M Ω resistance.
8. When the internal wire is opened in the high voltage capacitor, the capacitor shows an infinite resistance.
9. The resistance across all the terminals and the chassis must be infinite when the capacitor is normal. If incorrect reading are obtained, the high voltage capacitor must be replaced.
10. CARRY OUT 4R CHECKS.

E SWITCH TEST

1. CARRY OUT 3D CHECKS.
2. Isolate the switch to be tested and using an ohmmeter check between the terminals as described in the following table.

Table: Terminal Connection of Switch

Plunger Operation	COM to NO	COM to NC
Released	Open circuit	Short circuit
Depressed	Short circuit	Open circuit

COM; Common terminal,
NO; Normally open terminal
NC; Normally close terminal

If incorrect readings are obtained, make the necessary switch adjustment or replace the switch.

3. CARRY OUT 4R CHECKS.

F HIGH VOLTAGE FUSE F3 TEST

1. CARRY OUT 3D CHECKS.
2. Remove the back plate from the oven, referring to "BACK PLATE REMOVAL".
3. If the high voltage fuse F3 is blown, there could be a short in the high voltage rectifier or the magnetron.
Check them and replace the defective parts and the high voltage fuse F3.
4. CARRY OUT 4R CHECKS.

CAUTION: ONLY REPLACE HIGH VOLTAGE FUSE F3 WITH THE CORRECT VALUE REPLACEMENT.

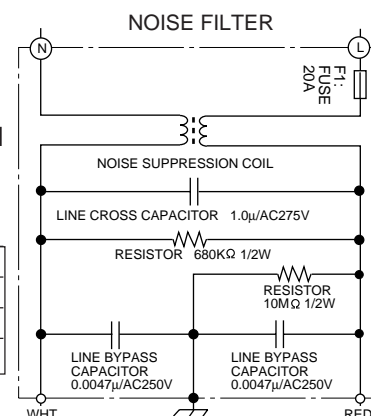
G NOISE FILTER TEST

1. CARRY OUT 3D CHECKS.
2. Disconnect the leads from the terminals of noise filter.
Using an ohmmeter, check between the terminals as described in the following table.

MEASURING POINTS	INDICATION OF OHMMETER
Between N and L	Approx. 680 k Ω
Between terminal N and WHITE	Short circuit
Between terminal L and RED	Short circuit

If incorrect readings are obtained, replace the noise filter unit.

- CARRY OUT 4R CHECKS.



TEST PROCEDURES

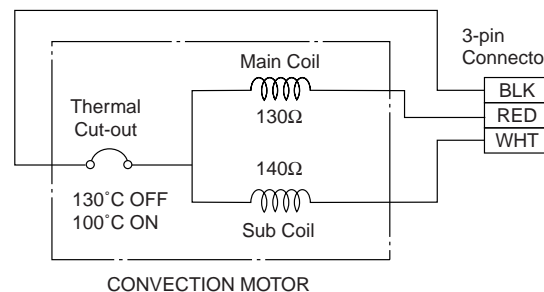
PROCEDURE LETTER	COMPONENT TEST
H	<p><u>BLOWN FUSE F1 20A</u></p> <ol style="list-style-type: none"> 1. CARRY OUT <u>3D</u> CHECKS. 2. If the fuse F1 20A is blown, there is a shorts or grounds in electrical parts or wire harness Check then and replace the defective parts or repair the wire harness. 3. CARRY OUT 4R CHECKS. <p>CAUTION: ONLY REPLACE FUSE F1 20A WITH CORRECT VALUE REPLACEMENT.</p>
I	<p><u>BLOWN FUSE F2 F10A</u></p> <ol style="list-style-type: none"> 1. CARRY OUT <u>3D</u> CHECKS. 2. If the fuse <u>F2</u> F10A is blown when the door is opened, check the secondary interlock switch, relay <u>RY2</u> and monitor switch. 3. If the fuse <u>F2</u> F10A is blown by incorrect door switching, replace the defective switch(s) and the fuse <u>F2</u> F10A. 4. If the fuse <u>F2</u> F10A is blown, there is a shorts or grounds in electrical parts or wire harness. Check them and replace the defective parts or repair the wire harness. 5. CARRY OUT 4R CHECKS. <p>CAUTION: ONLY REPLACE FUSE <u>F2</u> F10A WITH CORRECT VALUE REPLACEMENT.</p>
J	<p><u>MAGNETRON TEMPERATURE FUSE TF TEST</u></p> <ol style="list-style-type: none"> 1. CARRY OUT <u>3D</u> CHECKS. 2. A continuity check across the temperature fuse terminals should indicate a closed circuit unless the temperature of the magnetron reaches approximately 150°C. An open temperature fuse <u>TF</u> indicates overheating of the magnetron. Check for restricted air flow to the magnetron, especially the cooling duct and cooling fan. 3. CARRY OUT 4R CHECKS. <p>CAUTION: IF THE TEMPERATURE FUSE <u>TF</u> INDICATES AN OPEN CIRCUIT AT ROOM TEMPERATURE, REPLACE TEMPERATURE FUSE.</p>
K	<p><u>THERMAL CUT-OUT (TOP HEATER) TC1 TEST</u></p> <ol style="list-style-type: none"> 1. CARRY OUT <u>3D</u> CHECKS. 2. A continuity check across the thermal cut-out <u>TC1</u> terminals should indicate a closed circuit unless the temperature of the thermal cut-out <u>TC1</u> reaches approximately 170°C. The thermal cut-out <u>TC1</u> resets automatically at approximately 155°C. If thermal cut-out <u>TC1</u> has opened under normal condition, replace the same item as in the parts list. An open thermal cut-out <u>TC1</u> indicates overheating of the top heating element unit. Check for restricted air flow to the top heat element unit through the vent holes of the oven cavity, especially the heater duct upper and convection fan. 3. CARRY OUT 4R CHECKS. <p>CAUTION: IF THE THERMAL CUT-OUT <u>TC1</u> INDICATES AN OPEN CIRCUIT AT ROOM TEMPERATURE, REPLACE THERMAL CUT-OUT <u>TC1</u>.</p>
L	<p><u>THERMAL CUT-OUT (SIDE HEATER) TC2 TEST</u></p> <ol style="list-style-type: none"> 1. CARRY OUT <u>3D</u> CHECKS. 2. A continuity check across the thermal cut-out <u>TC2</u> terminals should indicate a closed circuit unless the temperature of the thermal cut-out <u>TC2</u> reaches approximately 150°C. The thermal cut-out <u>TC2</u> resets automatically at approximately 130°C. If thermal cut-out <u>TC2</u> has opened under normal condition, replace the same item as in the parts list. An open thermal cut-out <u>TC2</u> indicates overheating of the side heating element unit. Check for restricted air flow to the side heat element unit through the vent holes of the oven cavity, especially the heater duct left and convection fan. 3. CARRY OUT 4R CHECKS. <p>CAUTION: IF THE THERMAL CUT-OUT <u>TC2</u> INDICATES AN OPEN CIRCUIT AT ROOM TEMPERATURE, REPLACE THERMAL CUT-OUT <u>TC2</u>.</p>

TEST PROCEDURES

PROCEDURE LETTER	COMPONENT TEST				
M	<u>TOP HEATING ELEMENT H1 TEST</u> <ol style="list-style-type: none"> 1. CARRY OUT <u>3D</u> CHECKS. 2. Make sure the heating element is fully cooled and test as follows; <ol style="list-style-type: none"> a. Disconnect wire leads from the heating element and measure the resistance with an ohmmeter. On the R x 1 scale, the resistance between the heating element terminals should be approximately 34Ω. b. Disconnect wire leads from the heating element and measure the insulation resistance with 500V - 100MΩ insulation resistance meter. The insulation resistance between heating element terminal and cavity should be more than 0.5MΩ. 3. If the meter does not indicate above resistance, replace the top heating element. 4. CARRY OUT 4R CHECKS. 				
N	<u>SIDE HEATING ELEMENT H2 TEST</u> <ol style="list-style-type: none"> 1. CARRY OUT <u>3D</u> CHECKS. 2. Make sure the heating element is fully cooled and test as follows; <ol style="list-style-type: none"> a. Disconnect wire leads from the heating element and measure the resistance with an ohmmeter. On the R x 1 scale, the resistance between the heating element terminals should be approximately 43 Ω. b. Disconnect wire leads from the heating element and measure the insulation resistance with 500V - 100MΩ insulation resistance meter. The insulation resistance between heating element terminal and cavity should be more than 0.5MΩ. 3. If the meter does not indicate above resistance, replace the side heating element. 4. CARRY OUT 4R CHECKS. 				
O	<u>THERMISTOR TEST</u> <ol style="list-style-type: none"> 1. CARRY OUT <u>3D</u> CHECKS. 2. Remove the back plate from the oven, referring to "BACK PLATE REMOVAL". 3. Disconnect connector-E from the control unit. Measure the resistance of the thermistor with an ohmmeter. Connect the ohmmeter leads to Pin No's E-5 and E-6. <table border="1" data-bbox="491 1211 1193 1292"> <tr> <td>Room Temperature</td><td>Resistance</td></tr> <tr> <td>68°F(20°C) - 86°F(30°C)</td><td>Approx. 360 kΩ - 152 KΩ</td></tr> </table> 4. If the meter does not indicate above resistance, replace the thermistor. 5. CARRY OUT 4R CHECKS. 	Room Temperature	Resistance	68°F(20°C) - 86°F(30°C)	Approx. 360 kΩ - 152 KΩ
Room Temperature	Resistance				
68°F(20°C) - 86°F(30°C)	Approx. 360 kΩ - 152 KΩ				
P	<u>DAMPER MOTOR DM TEST</u> <p>When the power cord is plugged into the wall receptacle and the rated voltage is supplied to the damper motor, the motor operates until the damper is opened and the damper switch closes. Then the damper motor stops operation.</p> <p>If the damper motor does not operate, check for A.C. voltage with a voltmeter at the motor.</p> <ol style="list-style-type: none"> 1. CARRY OUT <u>3D</u> CHECKS. 2. Remove the back plate from the oven, referring to "BACK PLATE REMOVAL". 3. Disconnect the leads to the primary of the high voltage transformer. 4. Ensure that the leads remain isolated from other components and oven chassis by using insulation tape. 5. Disconnect the wire leads of motor and connect the meter leads to the wire leads of main wire harness. 6. Reconnect the power cord into the wall receptacle. 7. If the rated voltage is indicated at the wire leads, replace the motor and if the rated voltage is not indicated, check the wire harness and control unit. 8. Disconnect the oven from power supply. 9. Open the door and wedge it open. 10. Discharge high voltage capacitor. 11. CARRY OUT 4R CHECKS. 				
Q	<u>DAMPER SWITCH SW5 TEST</u> <ol style="list-style-type: none"> 1. CARRY OUT <u>3D</u> CHECKS. 				

TEST PROCEDURES

PROCEDURE LETTER	COMPONENT TEST
	<ol style="list-style-type: none"> Disconnect the leads to the primary of the high voltage transformer. Ensure that the leads remain isolated from other components and oven chassis by using insulation tape. Disconnect the wire leads from the switch terminals and connect ohmmeter leads to the common (COM.) and normally open (N.O.) terminals of the switch. 4-1. When switch actuator is pushed by the damper motor cam, the meter should be indicated a closed circuit. 4-2. When power cord is plugged into the wall receptacle, the damper motor operates and damper cam will start to rotate. When the switch actuator is released, the meter should be indicated an open circuit. If improper operation is indicated, replace the damper switch. Disconnect the oven from power supply, and then remove outer case. Open the door and wedge it open. Discharge high voltage capacitor. CARRY OUT 4R CHECKS.
R	<p><u>CONVECTION MOTOR CAPACITOR C2 TEST</u></p> <ol style="list-style-type: none"> CARRY OUT 3D CHECKS. Disconnect input leads and check for short or open between the terminals using an ohmmeter. Checking with a high ohm scale, if the capacitor is normal, the meter will indicate continuity for a short time and should indicate an open circuit once the capacitor is charged. If the above is not the case, check the capacitor with an ohmmeter to see if it is shorted between the terminals. If it is shorted, replace the capacitor. CARRY OUT 4R CHECKS.
S	<p><u>CONVECTION MOTOR CM TEST</u></p> <ol style="list-style-type: none"> CARRY OUT 3D CHECKS. Remove the back plate from the oven, referring to "BACK PLATE REMOVAL". Disconnect the 3-pin connector of the convection motor from the main wire harness. Measure the resistance of the convection motor with an ohmmeter. The resistance of the main coil, across the black and the red wires, should be approximately 130 ohms. The resistance of the sub coil, across the black and the white wires, should be approximately 140 ohms. Also, the convection motor has the thermal cut-out in it. Measure the resistance of the main coil (or the sub coil). The resistance across the black and the red wires (or across the black and the white wires) should be above resistance unless the temperature of the thermal cut-out reaches approximately 130°C. The thermal cut-out resets automatically at 100°C. If an ohmmeter indicates an open circuit under normal condition, replace the convection motor because the thermal cut-out has opened. An open thermal cut-out indicates overheating of the convection motor. Check for restricted air flow to the convection motor or a lock of the convection fan, especially the fan motor (high voltage transformer side). CARRY OUT 4R CHECKS.
T	<p><u>CHECKING TEMPERATURE IN THE CONVECTION MODE</u></p> <p>The following test procedure should be carried out with the microwave oven is a fully assembled condition (outer case fitted).</p> <p>It is difficult to measure the exact temperature in the convection oven. An accurate thermocouple type temperature tester must be used. A low priced bi-metal type thermometer is not reliable or accurate. The temperature should be checked with outer case cabinet installed, approx. 5 minutes after preheat temperature is reached (audible signal sounds four times). The temperature experienced may be approx. 17°C more or less than indicated on the display, however, in most cases the food cooking results will be satisfactory.</p>



TEST PROCEDURES

PROCEDURE LETTER	COMPONENT TEST
	Difference in power supply voltage will also affect the oven temperature. The Household power supply voltage may sometimes become lower than the rated voltage and cause under-cooking. If the power supply voltage is 10% lower than the rated voltage, longer cooking time is required by 10% to 20%.

U MOTOR WINDING TEST

1. CARRY OUT 3D CHECKS.
2. Remove the back plate from the oven, referring to "BACK PLATE REMOVAL".
3. Disconnect the leads from the motor. Using an ohmmeter, check the resistance between the two terminals as described in the table below.

Table: Resistance of Motor

Motors	Resistance
Fan motor FM	Approximately 77 Ω
Turntable motor TTM	Approximately 12 k Ω
Damper motor DM	Approximately 11 k Ω

If incorrect readings are obtained, replace the motor.

4. CARRY OUT 4R CHECKS.

V TOUCH CONTROL PANEL ASSEMBLY TEST

The touch control panel consists of circuits including semiconductors such as LSI, ICs, etc. Therefore, unlike conventional microwave ovens, proper maintenance cannot be performed with only a voltmeter and ohmmeter. In this service manual, troubleshooting by unit replacement is described according to the symptoms indicated.

Before testing,

- 1) CARRY OUT 3D CHECKS.
 - 2) Disconnect the leads to the primary of the high voltage transformer.
 - 2) Ensure that these leads remain isolated from other components and oven chassis by using insulation tape.
1. Tact switch
NOTE ;
 - 1) Reinstall the outer case (cabinet).
 - 2) Reconnect the power supply cord after the outer case is installed.
 - 3) Run the oven and check all functions.

The following symptoms indicate a defective tact switch.

 - a) When touching the pads, a certain pad produces no signal at all.
 - b) When touching a number pad, two figures or more are displayed.
 - c) When touching the pads, sometimes a pad produces no signal.

If the tact switch is defective.

 - 1) CARRY OUT 3D CHECKS.
 - 2) Replace the CPU unit.
 - 3) CARRY OUT 4R CHECKS.
 2. Control Unit
The following symptoms indicate a defective control unit. Before replacing the control unit, perform the tact switch test (Procedure W) to determine if control unit is faulty. Reconnect the power supply cord. And check for followings.
 - 2-1 In connection with pads.
 - a) When touching the pads, a certain group of pads do not produce a signal.
 - b) When touching the pads, no pads produce a signal.
 - 2-2 In connection with indicators
 - a) At a certain digit, all or some segments do not light up.
 - b) At a certain digit, brightness is low.
 - c) Only one indicator does not light.
 - d) The corresponding segments of all digits do not light up; or they continue to light up.
 - e) Wrong figure appears.
 - f) A certain group of indicators do not light up.
 - g) The figure of all digits flicker.
 - 2-3 Other possible problems caused by defective control unit.
 - a) Buzzer does not sound or continues to sound.

TEST PROCEDURES

PROCEDURE LETTER

COMPONENT TEST

b) Clock does not operate properly.

c) Cooking is not possible.

d) Proper temperature measurement is not obtained.

When testing is completed, CARRY OUT 4R CHECKS.

W

TACT SWITCH TEST

1. CARRY OUT 3D CHECKS.

2. By using an ohmmeter, check the tact switch operation.

3. When the tact switch is not depressed, an ohmmeter should indicate an open circuit. When the tact switch is depressed, an ohmmeter should indicate a short circuit. If improper operation is indicated, the tact switch is probably defective and should be checked.

X

RELAY TEST

1. CARRY OUT 3D CHECKS.

2. Disconnect the leads to the primary of the high voltage transformer.

3. Ensure that these leads remain isolated from other components and oven chassis by using insulation tape.

4. After that procedure, re-connect the power supply cord.

5. Remove the outer case and check voltage between Pin Nos. 1 and 9 of the 5 pin connector (CN-D) on the control unit with an A.C. voltmeter. The meter should indicate the rated voltage, if not check oven circuit.

Shut-off, Cook and Heater Relays Test

These relays are operated by D.C. voltage

Check voltage at the relay coil with a D.C. voltmeter during the microwave cooking operation, grill, dual1, dual2, preheating, or convection cooking condition.

DC. voltage indicated Defective relay.

DC. voltage not indicated Check diode which is connected to the relay coil. If diode is good, control unit is defective.

RELAY SYMBOL	OPERATIONAL VOLTAGE	CONNECTED COMPONENTS
RY1	Approx. 18V D.C.	Oven lamp / Turntable motor
RY2 (COOK)	Approx. 18V D.C.	High voltage transformer
RY3	Approx. 24V D.C.	Convection motor
RY4	Approx. 24V D.C.	Damper motor
RY5	Approx. 24V D.C.	Fan motor
RY6	Approx. 24V D.C.	Convection motor

6. CARRY OUT 4R CHECKS.

Y

SOLID-STATE RELAY TEST

1. CARRY OUT 3D CHECKS.

2. Disconnect the wire leads from the solid-state relay.

3. Measure the resistance between the terminals as described in the following table, with an ohmmeter.

Terminals	Resistance
Between 1 and 2	Approx. 50MΩ
Between 3 and 4	Approx. 1.3MΩ

1

2

3

4

Solid-state relay

4. If the meter does not indicate above resistance, replace the solid-state relay.

5. CARRY OUT 4R CHECKS.

Z

PROCEDURES TO BE TAKEN WHEN THE FUSE 1 ON THE PRINTED WIRING BOARD (PWB) IS OPEN AND TOUCH CONTROL TRANSFORMER TEST.

To protect the electronic circuits, this model is provided with a fuse added to the primary on the PWB.

1. Fuse 1 check and repairs and touch control transformer test.

TEST PROCEDURES

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COMPONENT TEST

1) CARRY OUT 3D CHECKS.

2) If the Fuse 1 is blown, replace the power unit.

3) Make a visual inspection of the varistor. Check for burned damage and examine the touch control transformer with a tester for the presence of layer short-circuit (check the primary coil resistance which is approximately $275\Omega \pm 10\%$). If any abnormal condition is detected, replace the touch control transformer or power unit.

4) CARRY OUT 4R CHECKS.

2. Follow the troubleshooting guide given below, if indicator does not light up after above check and repairs are finished.

1) CARRY OUT 3D CHECKS.

2) Disconnect the leads to the primary of the high voltage transformer.

3) Ensure that these leads remain isolated from other components and oven chassis by using insulation tape.

4) After that procedure, re-connect the power supply cord.

5) Follow the troubleshooting guide given below for repair.

STEPS	OCCURRENCE	CAUSE OR CORRECTION
1	The rated AC voltage is not present to power terminal of CPU connector (CN-D).	Check supply voltage and oven power cord.
2	The rated AC voltage is present at primary side of low voltage transformer.	Low voltage transformer or secondary circuit defective. Check and repair.

6) CARRY OUT 4R CHECKS.

TOUCH CONTROL PANEL ASSEMBLY

OUTLINE OF TOUCH CONTROL PANEL

The touch control section consists of the following units as shown in the touch control panel circuit.

- (1) Tact switch circuit on the CPU unit.
- (2) Control Unit (The control unit consists of Power unit and CPU unit.)

The principal functions of these units and the signals communicated among them are explained below.

Tact Switch Circuit

The tact switch circuit is composed of a matrix, signals AN0-AN7 generated in the LSI are sent to the tact switches. When a tact switch is touched, a signal is completed through the tact switch circuit and passed back to the LSI through PB0-PB3 to perform the function that was requested.

Control Unit

Control unit consists of LSI, power source circuit, synchronizing signal circuit, reset circuit, buzzer circuit, temperature measurement circuit, relay watching circuit, input voltage circuit and indicator circuit.

1) LSI

This LSI controls the temperature measurement signal, tact switch strobe signal, relay driving signal and indicator signal. And also LSI watches the relay operation and the primary input voltage.

2) Power Source Circuit

This circuit generates the voltages necessary for the control unit from the AC line voltage.

3) Synchronizing Signal Circuit

The power source synchronizing signal is available in order to compose a basic standard time in the clock circuit. It incorporates a very small error because it works on commercial frequency.

4) Reset Circuit

A circuit to generate a signals which resetting the LSI to the initial state when power is applied.

5) Buzzer Circuit

The buzzer is responds to signals from the LSI to emit noticing sounds (tact switch touch sound and completion sound).

6) Temperature Measurement Circuit : (OVEN THERMISTOR)

The temperature in the oven cavity is sensed by the thermistor. The variation of resistance according to sensed temperature is detected by the temperature measurement circuit and the result applied to LSI. The LSI uses this information to control the relay and display units.

7) Relay Operation Watching Circuit

This circuit watches so that the three (3) relays for the top heating element, the side heating element and the power transformer do not operate at the same time.

8) Input Voltage Watching Circuit

This circuit watches the primary input voltage.

9) Door Sensing Switch

A switch to inform the LSI if the door is open or closed.

10) Relay Circuit

To drive the magnetron, heating element, fan motor, convection motor, damper motor, turntable motor and light the oven lamp.

11) Indicator Circuit

Indicator element is a Fluorescent Display. Basically, a Fluorescent Display is triode having a cathode, a grid and an anode. Usually, the cathode of a Fluorescent Display is directly heated and the filament serves as cathode.

The Fluorescent Display has 10-digits, 42-segments are used for displaying figures.

12) LED Circuit

A circuit to drive the Light-emitting diodes (LD1-LD11).

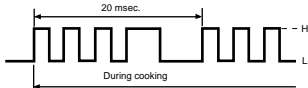
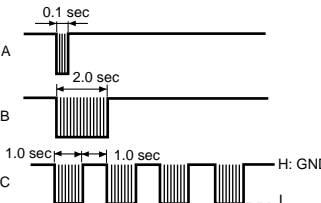
13) Damper Switch

A switch to tell the LSI if the damper is open or close.

DESCRIPTION OF LSI

The I/O signals of the LSI are detailed in the following table.

Pin No.	Signal	I/O	Description
2	AN4	OUT	<u>Tact switch strobe signal.</u> Signal applied to tact switch section. <u>LED driving signal.</u> Signal is applied to the Light-emitting diodes (LD4-5).
3	AN3	OUT	<u>Tact switch strobe signal.</u> Signal applied to tact switch section. <u>LED driving signal.</u> Signal is applied to the Light-emitting diode (LD3).
4	AN2	OUT	<u>Tact switch strombe signal.</u> Signal applied to tact switch section.
5	AN1	OUT	<u>Tact switch strobe signal.</u> Signal applied to tact switch section. <u>LED driving signal.</u> Signal is applied to the Light-emitting diode (LD2).
6	AN0	OUT	<u>Tact switch strobe signal.</u> Signal applied to tact switch section. <u>LED driving signal.</u> Signal is applied to the Light-emitting diode (LD1).

Pin No.	Signal	I/O	Description																														
7	AN15	IN	Primary input voltage watching terminal. The LSI is watching the primary input voltage through this terminal.																														
8-10	AN14-AN12	IN	Input terminal to change the specification according to the model.																														
11	AN11	IN	Temperature measurement input: OVEN THERMISTOR. By inputting DC voltage corresponding to the temperature detected by the thermistor, this input is converted into temperature by the A/D converter built into the LSI.																														
12	AN10	IN	Input signal which communicates the door open/close information to LSI. Door closed; "H" level signal(0V). Door opened; "L" level signal(-5V).																														
13	AN9	IN	Input signal which communicates the damper open/close information to LSI. Damper closed; "H" level signal(0V:GND). Damper opened; "L" level signal(-5V).																														
14	AN8	IN	Relay operation watching terminal. The LSI is watching so that the three (3) relays for the top heating element, the side heating element and the power transformer do not operate at the same time.																														
15	P83	OUT	Timing signal output terminal for temperature measurement(OVEN THERMISTOR). "L" level (-5V) : Thermistor OPEN timing. "H" level (GND): Temperature measuring timing.(Convection cooking,Speed grill cooking, Speed roast cooking, Speed bake cooking or preheat)																														
16	P82	OUT	Oven lamp and turntable motor driving signal. (Square Waveform : 50Hz) To turn on and off the shut-off relay(RY1). The square waveform voltage is delivered to the relay(RY1) driving circuit. <div></div>																														
17	CNVSS	IN	Power source voltage: -5V. VC voltage of power source circuit input.																														
18	RESET	IN	Auto clear terminal. Signal is input to reset the LSI to the initial state when power is applied. Temporarily set to "L" level the moment power is applied, at this time the LSI is reset. Thereafter set at "H" level.																														
19	P81	OUT	Top heating element driving signal. To operate the solid-state relay for driving the top heating element.																														
20	P80	OUT	Side heating element driving signal. To operate the solid-state relay for driving the top heating element.																														
21	VSS	IN	Power source voltage: -5V. VS voltage of power source circuit input.																														
22	XIN	IN	Internal clock oscillation frequency setting input. The internal clock frequency is set by inserting the ceramic filter oscillation circuit with respect to XOUT terminal.																														
23	XOUT	OUT	Internal clock oscillation frequency control output. Output to control oscillation input of XIN.																														
24	VCC	IN	Power source voltage: 0V. VC voltage of power source circuit input. Connected to GND.																														
25	P77	OUT	Signal to sound buzzer. A: Tact switch touch sound. B: Completion sound. C: When the oven stops so that the food can be checked in Automatic cooking mode. <div></div>																														
26	P76	OUT	Magnetron high-voltage circuit driving signal. To turn on and off the cook relay(RY2). In P-HI operation, the signals holds "L" level during microwave cooking and "H" level while not cooking. In other cooking modes (70%, 50%, 30%, 10%) the signal turns to "H" level and "L" level in repetition according to the power level. <div><table><tr><th></th><th colspan="2">Microwave cooking mode</th><th colspan="2">Microwave cooking with other cooking mode</th></tr><tr><th>VARI MODE</th><th>ON TIME</th><th>OFF TIME</th><th>ON TIME</th><th>OFF TIME</th></tr><tr><td>approx. 70% power</td><td>24 sec.</td><td>8 sec.</td><td>36sec.</td><td>12sec.</td></tr><tr><td>approx. 50% power</td><td>18 sec.</td><td>14 sec.</td><td>26sec.</td><td>22sec.</td></tr><tr><td>approx. 30% power</td><td>12 sec.</td><td>20 sec.</td><td>16sec.</td><td>32sec.</td></tr><tr><td>approx. 10% power</td><td>6 sec.</td><td>26 sec.</td><td>8sec.</td><td>40sec.</td></tr></table></div>		Microwave cooking mode		Microwave cooking with other cooking mode		VARI MODE	ON TIME	OFF TIME	ON TIME	OFF TIME	approx. 70% power	24 sec.	8 sec.	36sec.	12sec.	approx. 50% power	18 sec.	14 sec.	26sec.	22sec.	approx. 30% power	12 sec.	20 sec.	16sec.	32sec.	approx. 10% power	6 sec.	26 sec.	8sec.	40sec.
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Pin No.	Signal	I/O	Description																																																																																																																		
27	P75	OUT	Cooling fan motor driving signal. To turn on and off shut-off relay(RY5). “L” level during both microwave and convection cooking; “H” level otherwise																																																																																																																		
28	P74	OUT	Damper motor relay driving signal. To turn on and off shut-off relay(RY4).																																																																																																																		
29	P73	OUT	Convection motor driving signal. To turn on and off shut-off relay(RY3). “L”level during CONVECTION, GRILL, DUAL1, DUAL2 or PREHEAT; “H” level otherwise																																																																																																																		
30	P72	OUT	Control signal to turn over the rotatory direction of the convection motor.																																																																																																																		
31	P71	IN	Signal to synchronize LSI with commercial power source frequency. This is the basic timing for all real time processing of LSI.																																																																																																																		
32	P70	IN/OUT	Memory (EEPROM) data input/output.																																																																																																																		
33	P67	OUT	Terminal to input the program to LSI.																																																																																																																		
34	P66	IN	Terminal to input the program to LSI.																																																																																																																		
35	P65	OUT	Memory (EEPROM) clock out.																																																																																																																		
36	P64	IN/OUT	Terminal to input the program to LSI.																																																																																																																		
37-88	FLD51-FLD0	OUT	Segment data signals. The relation between signals and indicator are as follows: <table><tr><td>Signal (Pin No.)</td><td>Segment (Pin No.)</td><td>Signal (Pin No.)</td><td>Segment (Pin No.)</td><td>Signal (Pin No.)</td><td>Segment (Pin No.)</td></tr><tr><td>FLD 0 (88)</td><td>10G(45)</td><td>FLD 18 (70)</td><td>P9 (67)</td><td>FLD 36 (52)</td><td>P30 (19)</td></tr><tr><td>FLD 1 (87)</td><td>9G (46)</td><td>FLD 19 (69)</td><td>P10 (68)</td><td>FLD 37 (51)</td><td>P29 (20)</td></tr><tr><td>FLD 2 (86)</td><td>8G (47)</td><td>FLD 20 (68)</td><td>P11 (69)</td><td>FLD 38 (50)</td><td>P28 (21)</td></tr><tr><td>FLD 3 (85)</td><td>7G (48)</td><td>FLD 21 (67)</td><td>P12 (70)</td><td>FLD 39 (49)</td><td>P27 (22)</td></tr><tr><td>FLD 4 (84)</td><td>6G (49)</td><td>FLD 22 (66)</td><td>P13 (71)</td><td>FLD 40 (48)</td><td>P26 (23)</td></tr><tr><td>FLD 5 (83)</td><td>5G (50)</td><td>FLD 23 (65)</td><td>P14 (72)</td><td>FLD 41 (47)</td><td>P25 (24)</td></tr><tr><td>FLD 6 (82)</td><td>4G (51)</td><td>FLD 24 (64)</td><td>P42 (7)</td><td>FLD 42 (46)</td><td>P24 (25)</td></tr><tr><td>FLD 7 (81)</td><td>3G (52)</td><td>FLD 25 (63)</td><td>P41 (8)</td><td>FLD 43 (45)</td><td>P23 (26)</td></tr><tr><td>FLD 8 (80)</td><td>2G (53)</td><td>FLD 26 (62)</td><td>P40 (9)</td><td>FLD 44 (44)</td><td>P22 (27)</td></tr><tr><td>FLD 9 (79)</td><td>1G (54)</td><td>FLD 27 (61)</td><td>P39 (10)</td><td>FLD 45 (43)</td><td>P21 (28)</td></tr><tr><td>FLD10 (78)</td><td>P1 (59)</td><td>FLD 28 (60)</td><td>P38 (11)</td><td>FLD 46 (42)</td><td>P20 (29)</td></tr><tr><td>FLD11 (77)</td><td>P2 (60)</td><td>FLD 29 (59)</td><td>P37 (12)</td><td>FLD 47 (41)</td><td>P19 (30)</td></tr><tr><td>FLD12 (76)</td><td>P3 (61)</td><td>FLD 30 (58)</td><td>P36 (13)</td><td>FLD 48 (40)</td><td>P18 (31)</td></tr><tr><td>FLD13 (75)</td><td>P4 (62)</td><td>FLD 31 (57)</td><td>P35 (14)</td><td>FLD 49 (39)</td><td>P17 (32)</td></tr><tr><td>FLD14 (74)</td><td>P5 (63)</td><td>FLD 32 (56)</td><td>P34 (15)</td><td>FLD 50 (38)</td><td>P16 (33)</td></tr><tr><td>FLD15 (73)</td><td>P6 (64)</td><td>FLD 33 (55)</td><td>P33 (16)</td><td>FLD 51 (37)</td><td>P15 (34)</td></tr><tr><td>FLD16 (72)</td><td>P7 (65)</td><td>FLD 34 (54)</td><td>P32 (17)</td><td></td><td></td></tr><tr><td>FLD17 (71)</td><td>P8 (66)</td><td>FLD 35 (53)</td><td>P31 (18)</td><td></td><td></td></tr></table>	Signal (Pin No.)	Segment (Pin No.)	Signal (Pin No.)	Segment (Pin No.)	Signal (Pin No.)	Segment (Pin No.)	FLD 0 (88)	10G(45)	FLD 18 (70)	P9 (67)	FLD 36 (52)	P30 (19)	FLD 1 (87)	9G (46)	FLD 19 (69)	P10 (68)	FLD 37 (51)	P29 (20)	FLD 2 (86)	8G (47)	FLD 20 (68)	P11 (69)	FLD 38 (50)	P28 (21)	FLD 3 (85)	7G (48)	FLD 21 (67)	P12 (70)	FLD 39 (49)	P27 (22)	FLD 4 (84)	6G (49)	FLD 22 (66)	P13 (71)	FLD 40 (48)	P26 (23)	FLD 5 (83)	5G (50)	FLD 23 (65)	P14 (72)	FLD 41 (47)	P25 (24)	FLD 6 (82)	4G (51)	FLD 24 (64)	P42 (7)	FLD 42 (46)	P24 (25)	FLD 7 (81)	3G (52)	FLD 25 (63)	P41 (8)	FLD 43 (45)	P23 (26)	FLD 8 (80)	2G (53)	FLD 26 (62)	P40 (9)	FLD 44 (44)	P22 (27)	FLD 9 (79)	1G (54)	FLD 27 (61)	P39 (10)	FLD 45 (43)	P21 (28)	FLD10 (78)	P1 (59)	FLD 28 (60)	P38 (11)	FLD 46 (42)	P20 (29)	FLD11 (77)	P2 (60)	FLD 29 (59)	P37 (12)	FLD 47 (41)	P19 (30)	FLD12 (76)	P3 (61)	FLD 30 (58)	P36 (13)	FLD 48 (40)	P18 (31)	FLD13 (75)	P4 (62)	FLD 31 (57)	P35 (14)	FLD 49 (39)	P17 (32)	FLD14 (74)	P5 (63)	FLD 32 (56)	P34 (15)	FLD 50 (38)	P16 (33)	FLD15 (73)	P6 (64)	FLD 33 (55)	P33 (16)	FLD 51 (37)	P15 (34)	FLD16 (72)	P7 (65)	FLD 34 (54)	P32 (17)			FLD17 (71)	P8 (66)	FLD 35 (53)	P31 (18)		
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89	VEE	IN	Anode (segment) of Fluorescent Display light-up voltage: -30V. VEE voltage of power source circuit input.																																																																																																																		
90	PB6	OUT	Terminal not used.																																																																																																																		
91	PB5	OUT	LED driving signal. Signal is applied to the light-emitting diodes (LD1, LD2, LD3, LD5, LD7, LD9 and LD11).																																																																																																																		
92	PB4	OUT	LED driving signal. Signal is applied to the light-emitting diodes (LD4, LD6, LD8 and LD10).																																																																																																																		
93-96	PB3-PB0	IN	Signal coming from tact switch.																																																																																																																		
97	AVSS	IN	A/D converter power source voltage. The power source voltage to drive the A/D converter in the LSI.																																																																																																																		
98	VREF	IN	Reference voltage input terminal. A reference voltage applied to the A/D converter in the LSI. Connected to GND.(0V)																																																																																																																		

Pin No.	Signal	I/O	Description
99	AN7	OUT	Tact switch strobe signal. Signal applied to tact switch section. LED driving signal. Signal is applied to the Light-emitting diodes (LD10-11).
100	AN6	OUT	Tact switch strobe signal. Signal applied to tact switch section. LED driving signal. Signal is applied to the Light-emitting diodes (LD8-9).

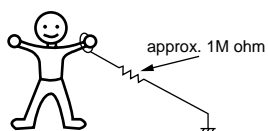
TOUCH CONTROL PANEL SERVICING

1. Precautions for Handling Electronic Components

This unit uses CMOS LSI in the integral part of the circuits. When handling these parts, the following precautions should be strictly followed. CMOS LSI have extremely high impedance at its input and output terminals. For this reason, it is easily influenced by the surrounding high voltage power source, static electricity charge in clothes, etc. and sometimes it is not fully protected by the built-in protection circuit.

In order to protect CMOS LSI.

- 1) When storing and transporting, thoroughly wrap them in aluminium foil. Also wrap all PW boards containing them in aluminium foil.
- 2) When soldering, ground the technician as shown in the figure and use grounded soldering iron and work table.



2. Servicing of Touch Control Panel

We describe the procedures to permit servicing of the touch control panel of the microwave oven and the precautions you must take when doing so. To perform the servicing, power to the touch control panel is available either from the power line of the oven itself or from an external power source.

(1) Servicing the touch control panel with power supply of the oven:

CAUTION:

THE HIGH VOLTAGE TRANSFORMER OF THE MICROWAVE OVEN IS STILL LIVE DURING SERVICING AND PRESENTS A HAZARD.

Therefore, before checking the performance of the touch control panel,

- 1) Disconnect the power supply cord, and then remove outer case.
- 2) Open the door and block it open.
- 3) Discharge high voltage capacitor.
- 4) Disconnect the leads to the primary of the power transformer.
- 5) Ensure that these leads remain isolated from other components and oven chassis by using insulation tape.
- 6) After that procedure, re-connect the power supply cord. After checking the performance of the touch control panel,
 - 1) Disconnect the power supply cord.
 - 2) Open the door and block it open.
 - 3) Re-connect the leads to the primary of the power transformer.
 - 4) Re-install the outer case (cabinet).
 - 5) Re-connect the power supply cord after the outer case is installed.
 - 6) Run the oven and check all functions.

A. On some models, the power supply cord between the touch control panel and the oven itself is so short that the two can't be separated. For those models, check and repair all the controls (sensor-related ones included) of the touch control panel while keeping it connected to the oven.

B. On some models, the power supply cord between the touch control panel and the oven proper is long enough that they may be separated from each other. For those models, it is possible to check and repair the controls of the touch control panel while keeping it apart from the oven proper; in this case you must short both ends of the door sensing switch (on PWB) of the touch control panel with a jumper, which activates an operational state that is equivalent to the oven door being closed. As for the sensor-related controls of the touch control panel, checking them is possible if dummy resistor(s) with resistance equal to that of the controls are used.

(2) Servicing the touch control panel with power supply from an external power source:

Disconnect the touch control panel completely from the oven proper, and short both ends of the door sensing switch (on PWB) of the touch control panel, which activates an operational state that is equivalent to the oven door being closed. Connect an external power source to the power input terminal of the touch control panel, then it is possible to check and repair the controls of the touch control panel it is also possible to check the sensor-related controls of the touch control panel by using the dummy resistor(s).

3. Servicing Tools

Tools required to service the touch control panel assembly.

- 1) Soldering iron: 60W
(It is recommended to use a soldering iron with a grounding terminal.)
- 2) Oscilloscope: Single beam, frequency range: DC-10MHz type or more advanced model.
- 3) Others: Hand tools

4. Other Precautions

- 1) Before turning on the power source of the control unit, remove the aluminium foil applied for preventing static electricity.
- 2) Connect the connectors of the key unit to the control unit being sure that the lead wires are not twisted.
- 3) After aluminium foil is removed, be careful that abnormal voltage due to static electricity etc. is not applied to the input or output terminals.
- 4) Attach connectors, electrolytic capacitors, etc. to PWB, making sure that all connections are tight.
- 5) Be sure to use specified components where high precision is required.

PRECAUTIONS FOR USING LEAD-FREE SOLDER

1. Employing lead-free solder

The "Main PWB" of this model employs lead-free solder. This is indicated by the "LF" symbol printed on the PWB and in the service manual. The suffix letter indicates the alloy type of the solder.

Example:

LFa
Sn-Ag-Cu

Indicates lead-free solder of tin, silver and copper.

2. Using lead-free wire solder

When repairing a PWB with the "LF" symbol, only lead-free solder should be used. (Using normal tin/lead alloy solder may result in cold soldered joints and damage to printed patterns.)

As the melting point of lead-free solder is approximately 40°C higher than tin/lead alloy solder, it is recommend that a dedicated bit is used, and that the iron temperature is adjusted accordingly.

3. Soldering

As the melting point of lead-free solder (Sn-Ag-Cu) is higher and has poorer wettability, (flow), to prevent damage to the land of the PWB, extreme care should be taken not to leave the bit in contact with the PWB for an extended period of time. Remove the bit as soon as a good flow is achieved. The high content of tin in lead free solder will cause premature corrosion of the bit. To reduce wear on the bit, reduce the temperature or turn off the iron when it is not required.

Leaving different types of solder on the bit will cause contamination of the different alloys, which will alter their characteristics, making good soldering more difficult. It will be necessary to clean and replace bits more often when using lead-free solder. To reduce bit wear, care should be taken to clean the bit thoroughly after each use.

COMPONENT REPLACEMENT AND ADJUSTMENT PROCEDURE

WARNING AGAINST HIGH VOLTAGE:

Microwave ovens contain circuitry capable of producing very high voltage and current, contact with following parts may result in severe, possibly fatal, electric shock.

(Example)

High Voltage Capacitor, High Voltage Transformer, Magnetron, High Voltage Rectifier Assembly, High Voltage Harness etc..

WARNING: Avoid possible exposure to microwave energy. Please follow the instructions below before operating the oven.

1. Disconnect the oven from power supply.
2. Make sure that a definite "click" can be heard when the microwave oven door is unlatched. (Pull down the door handle in a closed position with one hand, then push the door with the other, this causes the latch leads to rise, it is then possible to hear a "click" as the door switches operate.)
3. Visually check the door and cavity face plate for damage (dents, cracks, signs of arcing etc.).

Carry out any remedial work that is necessary before operating the oven.

Do not operate the oven if any of the following conditions exist;

1. Door does not close firmly.
2. Door hinge, support or latch hook is damaged.
3. The door gasket or seal is damaged.
4. The door is bent or warped.
5. There are defective parts in the door interlock system.
6. There are defective parts in the microwave generating and transmission assembly.
7. There is visible damage to the oven.

Do not operate the oven:

1. Without the RF gasket (Magnetron).
2. If the wave guide or oven cavity are not intact.
3. If the door is not closed.
4. If the outer case (cabinet) is not fitted.

WARNING FOR WIRING

To prevent an electric shock, take the following precautions.

1. Before wiring,
 - 1) Disconnect the oven from power supply.
 - 2) Open the door and wedge the door open.
 - 3) Discharge the high voltage capacitor and wait for 60 seconds.
2. Don't let the wire leads touch to the following parts;
 - 1) High voltage parts:
Magnetron, High voltage transformer, High voltage capacitor and High voltage rectifier assembly.
 - 2) Hot parts:
Oven lamp, Magnetron, High voltage transformer, Oven cavity and Heating element.
 - 3) Sharp edge:
Bottom plate, Oven cavity, Waveguide flange, Chassis support and other metallic plate.
 - 4) Moveable parts (to prevent a fault)
Fan blade, Fan motor, Switch, Door cam, Convection motor, Convection fan, Turntable motor, Damper motor, Damper door assembly.
3. Do not catch the wire leads in the outer case cabinet.
4. Insert the positive lock connector until its pin is locked and make sure that the wire leads do not come off even if the wire leads are pulled.
5. To prevent an error function, connect the wire leads correctly, referring to the Pictorial Diagram.

Please refer to 'OVEN PARTS, CABINET PARTS, CONTROL PANEL PARTS, DOOR PARTS', when carrying out any of the following removal procedures:

OUTER CASE REMOVAL

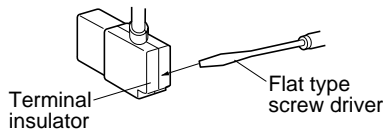
1. Disconnect the oven from power supply.
2. Open the oven door and wedge the door open.
3. Remove the four (4) screws holding the exhaust cover to the back plate and the outer case cabinet.
4. Remove the three (3) screws holding the outer case cabinet to the back plate.
5. Remove the four (4) screws holding the right and left sides of the outer case cabinet to the bottom plate.
6. Slide the entire outer case cabinet back out about 1 inch (3cm) to free it from retaining clips on the oven cavity front plate.
7. Lift entire outer case cabinet from the unit.
8. Discharge the H.V. capacitor before carrying out any further work.
9. Do not operate the oven with the outer case removed.
N.B.; Step 1, 2 and 8 form the basis of the 3D checks.

CAUTION

1. DISCONNECT THE OVEN FROM THE POWER SUPPLY BEFORE REMOVING THE OUTER CASE CABINET.
2. DISCHARGE THE HIGH VOLTAGE CAPACITOR BEFORE TOUCHING ANY OVEN COMPONENTS OR WIRING.

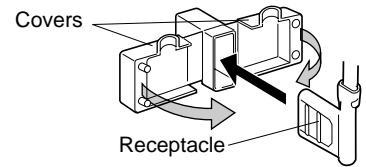
TERMINAL INSULATOR REPLACEMENT

1. Open covers of the terminal insulator by using small flat type screw driver.
2. Remove the receptacle from the terminal insulator.
3. Now, the terminal insulator is free.



Installation

1. Insert the receptacle into terminal insulator.
2. Close covers of the terminal insulator, as shown illustrated below



POWER SUPPLY CORD REPLACEMENT

Removal

1. CARRY OUT 3D CHECKS.
2. Remove the one (1) screw holding the green/ yellow wire of the power supply cord to the bottom plate.
3. Disconnect the blue and brown wire leads of the power supply cord from the noise filter.
4. Nip the cord bushing with bushing pliers and release it from the hole of the back plate.
5. Remove the cord bushing from the power supply cord, and the power supply cord from the back plate.
6. Now, the power supply cord is free.

Reinstall

1. Reinstall the cord bushing to the power supply cord.
2. Insert the power supply cord with the cord bushing into the hole of the back plate.
3. Hold the green/ yellow wire of the power supply cord to the bottom plate with the one (1) screw.
4. Reconnect the blue and brown wire leads of the power supply cord to noise filter, referring to the pictorial diagram.

5. Not to be caught by the outer case cabinet, pass the green/ yellow wire of the power supply cord under the high voltage capacitor.
6. Reinstall the outer case cabinet and check that the oven is operating properly.

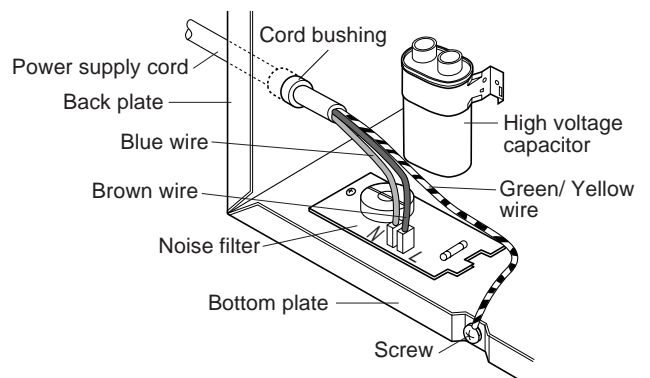


Figure C-1. Power supply cord replacement

BACK PLATE REMOVAL

1. CARRY OUT 3D CHECKS.
2. Remove the one (1) screw holding the green/ yellow wire of the power supply cord to the bottom plate.
3. Disconnect the blue and brown wire leads wire of the power supply cord from the noise filter.
4. Remove the three (3) screws holding the back plate to

the bottom plate.

5. Remove the two (2) screws holding the right and left chassis supports to the back plate.
6. Release the tabs of the chassis supports from the back plate.
7. Now, the back plate with the back plate is free.

HIGH VOLTAGE TRANSFORMER REMOVAL

1. CARRY OUT 3D CHECKS.
2. Remove the back plate from the oven, referring to "BACK PLATE REMOVAL".
3. Disconnect the main wire harness from the high voltage transformer.
4. Disconnect the filament leads of the high voltage transformer from the high voltage capacitor and the magnetron.

5. Disconnect the high voltage fuse from the high voltage transformer.
6. Remove the four (4) screws holding the transformer mounting angle to the bottom plate from under the bottom plate.
7. Remove the four (4) screws holding the high voltage transformer to the transformer mounting angle.
8. Now, the high voltage transformer is free.

MAGNETRON REMOVAL

1. CARRY OUT 3D CHECKS.
2. Remove the back plate from the oven, referring to "BACK PLATE REMOVAL".
3. Disconnect the high voltage wire of the high voltage rectifier assembly from the magnetron.
4. Disconnect the filament wire of the high voltage transformer from the magnetron.
5. Remove the two (2) screws holding the magnetron

guide to the magnetron and remove it.

6. Disconnect the wire leads and the connector from the solid-state relay.
7. Release the main wire harness from the hole of the magnetron separator and the hook of the fan motor.
8. Remove the three (3) screws holding the magnetron separator to the bottom plate and the thermal cover back.
9. Remove the magnetron separator from the oven.

10. Carefully remove the four (4) screws holding the magnetron to the waveguide. When removing the screws, hold the magnetron to prevent it from falling.
11. Remove the magnetron from the unit with care so the magnetron tube should not be hit by any metal object around the tube.

CAUTION: WHEN REPLACING THE MAGNETRON, BE SURE THE R.F. GASKET IS IN PLACE AND THE MAGNETRON MOUNTING SCREWS ARE TIGHTENED SECURELY.

HIGH VOLTAGE CAPACITOR, HIGH VOLTAGE FUSE AND HIGH VOLTAGE RECTIFIER ASSEMBLY REMOVAL

1. CARRY OUT 3D CHECKS.
2. Remove the back plate from the oven, referring to "BACK PLATE REMOVAL".
3. Disconnect the high voltage wire of the high voltage rectifier assembly from the magnetron.
4. Disconnect the filament lead of the high voltage transformer from the high voltage capacitor.
5. Disconnect the high voltage fuse from the high voltage transformer.
6. Remove the one (1) screw holding the capacitor holder to the fan motor mounting angle.

7. Remove the one (1) screw holding the high voltage rectifier assembly to the capacitor holder.
8. Disconnect the high voltage rectifier assembly and high voltage fuse from the high voltage capacitor.
11. Now, the high voltage rectifier assembly, high voltage fuse, and also the high voltage capacitor are free.

CAUTION: WHEN REPLACING HIGH VOLTAGE RECTIFIER ASSEMBLY, ENSURE THAT THE CATHODE (EARTH) CONNECTION IS SECURELY FIXED TO THE CAPACITOR HOLDER WITH AN EARTHING SCREW.

FAN MOTOR REMOVAL

HIGH VOLTAGE TRANSFORMER SIDE

1. CARRY OUT 3D CHECKS.
2. Remove the back plate from the oven, referring to "BACK PLATE REMOVAL".
3. Remove the one (1) screw holding the capacitor holder to the fan motor mounting angle. And remove the capacitor holder from the fan motor mounting angle.
4. Disconnect the wire leads from the fan motor.
5. Remove the four (4) screws holding the fan motor mounting angle to the bottom plate and the thermal cover back.
6. Remove the three (3) screws holding the fan motor to the fan motor mounting angle.
7. Now, the fan motor is free.

MAGNETRON SIDE ONE REMOVAL

1. CARRY OUT 3D CHECKS.
2. Remove the back plate from the oven, referring to "BACK PLATE REMOVAL".
3. Disconnect the wire leads from the fan motor.
4. Disconnect the connector of the main wire harness from the connector of the thermistor.
5. Release the main wire harness from the hole of the magnetron separator and the hook of the fan motor.
6. Remove the three (3) screws holding the magnetron separator to the bottom plate and the thermal cover back.
7. Remove the magnetron separator from the oven.
8. Remove the one (1) screw holding the fan motor to the bottom plate.
9. Now, the fan motor is free.

SOLID-STATE RELAY (MAGNETRON SIDE) REMOVAL

1. CARRY OUT 3D CHECKS.
2. Remove the back plate from the oven, referring to "BACK PLATE REMOVAL".
3. Disconnect the wire leads and the connector from the solid-state relay.
4. Release the main wire harness from the hole of the magnetron separator.
5. Remove the three (3) screws holding the magnetron separator to the bottom plate and the thermal cover back.
6. Remove the magnetron separator from the oven.

7. Remove the two (2) screws holding the solid-state relay to the magnetron separator.
8. Now, the solid-state relay is free.

CAUTION : WHEN THE SOLID-STATE RELAY (MAGNETRON SIDE ONE OR HEATER DUCT LEFT SIDE ONE) IS REINSTALLED, APPLY THE SILICON GREASE (SHINETSU SILICON GREASE G746 OF SHINETSU CHEMICAL CO.,LTD.) TO THE BACK SIDE OF THE SOLID-STATE RELAY IN A THICKNESS OF 0.3 MM. THIS IS TO PREVENT THE OVER HEATING OF THE SOLID-STATE RELAY.

DAMPER MOTOR AND DAMPER SWITCH REMOVAL

1. CARRY OUT 3D CHECKS.
2. Remove the back plate from the oven, referring to "BACK PLATE REMOVAL".
3. Remove the one (1) screw holding the right chassis support to the oven cavity front plate.
4. Disconnect the wire leads from the damper motor.
5. Remove the two (2) screws holding the damper motor to the motor mounting angle.

6. Now, the damper motor is free.
7. Disconnect the wire leads from the damper switch.
8. Remove the two (2) screws holding the motor mounting angle to the damper duct assembly.
9. Remove the one (1) screw holding the damper switch to the motor mounting angle.
10. Now, the damper switch is free.

HEATER DUCT LEFT ASSEMBLY, HEATER DUCT UPPER ASSEMBLY AND CONVECTION DUCT ASSEMBLY REMOVAL

1. CARRY OUT 3D CHECKS.
2. Remove the back plate from the oven, referring to "BACK PLATE REMOVAL".
3. Remove the door assembly from the oven, referring to "DOOR REPLACEMENT", and remove the door springs, the door cam right and the door cam left.
4. Remove the high voltage transformer, magnetron, magnetron separator, high voltage capacitor assembly, fan motor (high voltage transformer side) with fan mounting angle, and fan motor (magnetron side), referring to their removal procedures.
5. Disconnect the wire leads from all electrical parts except for the turntable motor, monitor switch, secondary interlock switch, door sensing switch and 3rd. latch switch.
6. Remove the two (2) screws holding the latch hook right and latch hook left from the oven cavity front plate.
7. Remove the two (2) screws holding the right and left chassis supports to the oven cavity front plate.
8. Remove the two (2) screws holding the exhaust duct to the oven cavity. And remove it.
9. Remove the one (1) screw holding the damper duct assembly to the oven cavity from inside of the oven cavity.
10. Remove the two (2) screws holding the damper duct assembly to the thermal cover upper and the waveguide.
11. Remove the damper duct assembly from the oven.
12. Remove the two (2) screws holding the separator left to the thermal cover upper. And remove it.
13. Disconnect the connector of the touch control transformer from the power unit.
14. Remove the one (1) screw holding the touch control transformer to the bottom plate. And remove it.
15. Remove the two (2) screws holding the PWB mounting angle to the bottom plate.
16. Remove the PWB mounting angle with the power unit from the bottom plate.
17. Remove the three (3) screws holding the thermal cover left to the heater duct left.
18. Remove the one (1) screw holding the thermal cover left to the thermal cover upper.
19. Straighten the three (3) tabs holding the thermal cover left to the oven cavity, and remove the thermal cover left and the thermal insulation left from the oven cavity.
20. Remove the two (2) screws holding the thermal cover upper to the heater duct upper.
21. Straighten the four (4) tabs holding the thermal cover upper to the oven cavity, and remove the thermal cover upper and the thermal insulation upper from the oven cavity.
22. Straighten the two (2) tabs holding the thermal insulation upper, and remove it.
23. Remove the fourteen (14) screws holding the heater duct left to the oven cavity and the convection duct.
24. Remove the heater duct left assembly from the oven cavity.
25. Now, the heater duct left assembly is free.
26. Remove the two (2) screws holding the convection motor mounting angle to the bottom plate from under the bottom plate.
27. Remove the thirteen (13) screws holding the convection duct to the oven cavity and the heater duct upper.
28. Remove the convection duct assembly from the oven cavity.
29. Now, the convection duct assembly is free.
30. Remove the nine (9) screws holding the heater duct upper to the oven cavity.
31. Remove the heater duct upper from the oven cavity.
32. Now, the heater duct upper assembly is free.

SIDE HEATING ELEMENT REMOVAL

1. CARRY OUT 3D CHECKS.
2. Remove the back plate from the oven, referring to "BACK PLATE REMOVAL".
3. Remove the heater duct left assembly from the oven cavity, referring to "HEATER DUCT LEFT ASSEMBLY, HEATER DUCT UPPER ASSEMBLY AND CONVECTION DUCT ASSEMBLY REMOVAL".
4. Remove the one (1) screw holding the heater mounting angle B to the heater duct left.
5. Remove the two (2) nuts holding the side heating element to the heater duct left.
6. Now, the side heating element is free.

CONVECTION MOTOR REMOVAL

1. CARRY OUT 3D CHECKS.
2. Remove the back plate from the oven, referring to "BACK PLATE REMOVAL".
3. Remove the convection duct assembly from the oven cavity, referring to "HEATER DUCT LEFT ASSEMBLY, HEATER DUCT UPPER ASSEMBLY AND CONVECTION DUCT ASSEMBLY REMOVAL".
4. Loosen the one (1) screw holding the convection fan assembly to the convection fan motor shaft with a hexagon key wrench, and remove the convection fan.
5. Remove the four (4) screws holding the convection motor mounting angle to the convection duct.
6. Remove the six (6) screws holding the convection motor to the convection motor mounting angle.
7. Remove the convection motor from the convection motor mounting angle.
8. Now, the convection motor is free.

TOP HEATING ELEMENT REMOVAL

1. CARRY OUT 3D CHECKS.
2. Remove the back plate from the oven, referring to "BACK PLATE REMOVAL".
3. Remove the heater duct left assembly from the oven cavity, referring to "HEATER DUCT LEFT ASSEMBLY, HEATER DUCT UPPER ASSEMBLY AND CONVECTION DUCT ASSEMBLY REMOVAL".
4. Remove the one (1) screw holding the heater mounting

- angle A to the heater duct upper.
- Remove the two (2) nuts holding the top heating

- Now, the top heating element is free.

TURNTABLE MOTOR REMOVAL

- Disconnect the oven from power supply.
- Wait for 60 seconds to discharge the high voltage capacitor.
- Remove the turntable tray and the turntable support from the oven cavity.
- Lay the oven on its backside.
- Remove the turntable motor cover by snipping off the material in four corners.
- Where the corners have been snipped off, bend corner

- areas flat. No sharp edges must be evident after removal of the turntable motor.
- Disconnect the wire leads from the turntable motor.
- Remove the one (1) screw holding the turntable motor to the oven cavity bottom plate.
- Now, the turntable motor is free.
- After replacement, use the one (1) screw to fit the turntable motor cover.

NOISE FILTER REMOVAL

- CARRY OUT 3D CHECKS.
- Remove the back plate from the oven, referring to "BACK PLATE REMOVAL".
- Remove the high voltage capacitor, referring to "HIGH VOLTAGE CAPACITOR, HIGH VOLTAGE RECTIFIER ASSEMBLY AND HIGH VOLTAGE FUSE REMOVAL".
- Now, the power supply cord should be disconnected

- from the noise filter.
- Disconnect the main wire harness form the noise filter.
- Remove the one (1) screw holding the noise filter to the bottom plate.
- Remove the noise filter from the bottom plate.
- Remove the fuse from the noise filter.
- Now, the noise filter is free.

DOOR SENSING SWITCH, 3RD. LATCH SWITCH, SECONDARY INTERLOCK SWITCH AND MONITOR SWITCH REPLACEMENT

Removal

- CARRY OUT 3D CHECKS.
- Disconnect the wire leads from the switch.
- Remove the one (1) screw holding the latch hook (right or left) to the oven cavity front plate, and release the latch hook (right or left).
- Keep pushing the stopper tub holding the switch to the latch hook (right or left) and revolve the switch on the pole.
- Remove the switch from the latch hook (right or left).
- Now, the switch is free.

Reinstallation

- Reinstall the switch in its place. The door sensing switch is in the lower position of the latch hook right. The 3rd. latch switch is in the upper position of the latch hook right. The secondary interlock switch is in the lower position of the latch hook left. And the monitor switch is in the upper position of the latch hook left.

- Hold the latch hook (right or left) to the oven cavity front plate with the one (1) screw.
- Reconnect the wire leads to the switch.
- Make sure that the monitor switch is operating properly and check continuity of the monitor circuit. Refer to chapter "Test Procedure" and "Adjustment procedure."

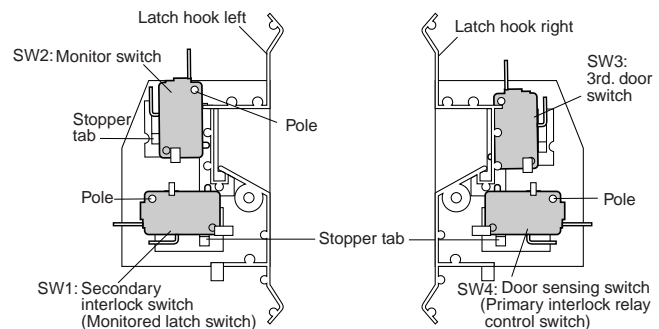


Figure C-2. Switches

DOOR SENSING SWITCH, 3RD. LATCH SWITCH, SECONDARY INTERLOCK SWITCH AND MONITOR SWITCH ADJUSTMENT

If the door sensing switch, 3rd. latch switch, secondary interlock switch and monitor switch do not operate properly due to a misadjustment, the following adjustment should be made.

- CARRY OUT 3D CHECKS.
- Loosen each one (1) screw holding the latch hook right and the latch hook left to the oven cavity front plate.
- With door closed, adjust the latch hook right and the latch hook left by moving them back and forth, and up and down. In and out play of the door allowed by the latch hook right and the latch hook left should be less than 0.5 mm. The vertical position of the latch hook right and the

latch hook left should be adjusted so that the door sensing switch and the secondary interlock switch are activated with the door closed. The horizontal position of the latch hook right and the latch hook left should be adjusted so that the plungers of the 3rd. latch switch and monitor switch are pressed with the door closed.

- Secure the screws firmly.
- Check all of the switches operation. If any switch has not activated with the door closed, loosen the screws and adjust the position of the latch hook right and the latch hook left.

After adjustment, check the following.

1. In and out play of the door remains less than 0.5 mm when in the latched position. First check the position of the latch hook right, pushing and pulling right portion of the door toward the oven face. Then check the position of the latch hook left, pushing and pulling left portion of the door toward the oven face. Both results (play in the door) should be less than 0.5 mm.
2. The door sensing switch, 3rd. latch switch and the secondary interlock switch interrupt the circuit before the door can be opened.
3. The monitor switch contacts close when the door is opened.
4. Reinstall the outer case cabinet and check for microwave leakage around the door with an approved microwave survey meter. (Refer to Microwave Measurement Procedure.)

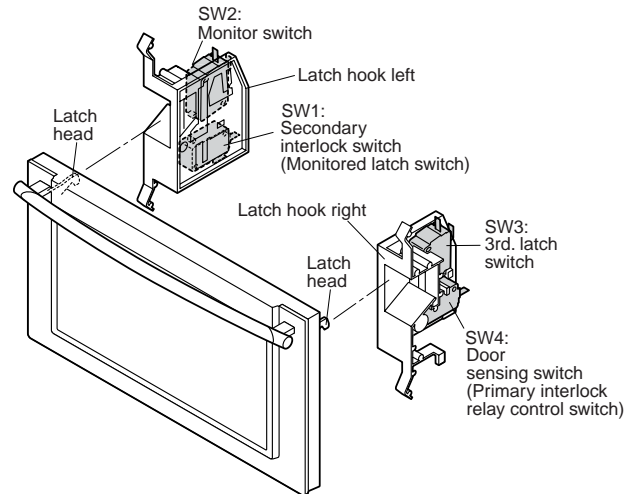


Figure C-3. Latch Switch Adjustment

DOOR REPLACEMENT AND ADJUSTMENT

Door assembly removal

1. CARRY OUT 3D CHECKS.
2. Close the door.
3. Remove the two (2) door springs from the door cam right, oven hinge right, door cam left and oven hinge left.
4. Release the door cams right and left from the right and left door cam pins of the door.
5. Remove the door cams right and left from the oven cavity front plate.
6. Open the door assembly at an angle of more than 90° with the oven cavity front plate.
7. To release the right and left door hinge pins of the door assembly from the oven hinges right and left, slide the door assembly leftward. When removing the door assembly, hold the door assembly to prevent it from falling.
8. Now, the door assembly is free.

NOTE: When the individual parts are replaced, refer to "Door Disassembly"

Door assembly reinstallation

1. On reinstalling the door assembly, insert the oven hinges right and left into the right and left door hinge pins.
2. Insert and hook the door cams right and left to the right and left door cam pins.
3. Reinstall the two (2) door springs between the door cams and the oven hinges right and left.

NOTE: After any service to the door;

(A) Make sure that the door sensing switch, 3rd. latch switch, secondary interlock switch and the monitor switch are operating properly. (Refer to chapter "Test Procedure".)

(B) An approved microwave survey meter should be used to assure compliance with proper microwave radiation emission limitation standards.

Door adjustment

When removing and/or loosening the oven hinges such as in door replacement, the following adjustment criteria are taken.

Door adjustment is performed with the door properly installed and closed and while the oven hinges are loose.

1. Loosen the screws holding the oven hinge right and the

oven hinge left to the bottom plate with screwdriver.

2. Adjust the door by moving it so that the door is parallel with the oven cavity front plate lines (right and left side lines) and the door latch heads pass through the latch holes correctly.
3. Tighten the screws holding the oven hinge right and the oven hinge left to the bottom plate.

After adjustment, make sure of the following:

1. The door latch heads smoothly catch the latch hooks through latch holes and the latch heads goes through centre of latch holes.
2. The door is positioned with its face pressed toward oven cavity front plate.
3. Reinstall the outer case cabinet and check for microwave leakage around the door with an approved microwave survey meter. (Refer to Microwave Measurement Procedure.)

NOTE: The door on a microwave oven is designed to act as an electronic seal preventing the leakage of microwave energy from the oven cavity during cook cycle. This function does not require that the door be airtight, moisture (condensation)-tight or light-tight. Therefore, occasional appearance of moisture, light or sensing of gentle warm air movement around the oven door is not abnormal and do not of themselves indicate a leakage of microwave energy from the oven cavity. If such were the case, your oven could not be equipped with a vent, the very purpose of which is exhaust the vapour-laden air from the oven cavity.

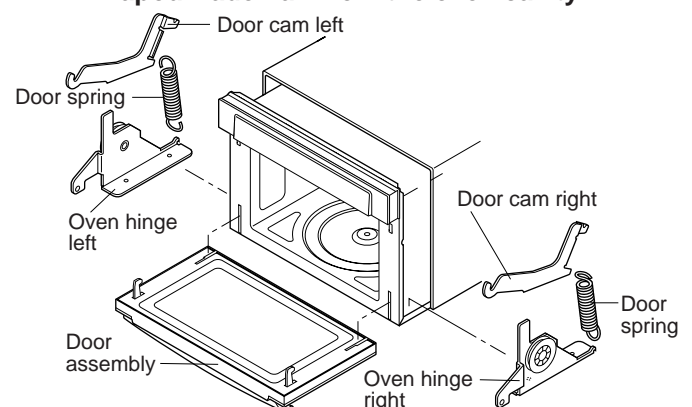


Figure C-4(a). Door Replacement

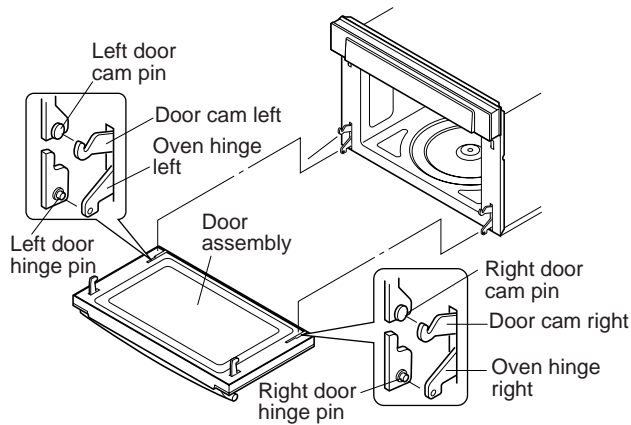


Figure C-4(b). Door Replacement

DOOR DISASSEMBLY

1. CARRY OUT 3D CHECKS.
2. Remove the door assembly, referring to "Door Replacement".
3. Place the door assembly on a soft cloth with latch heads facing up.

NOTE: As the engaging parts of the choke cover and the door panel assembly are provided at 16 places, do not force any particular part.

4. Replacement of the door components are as follows:

CHOKE COVER

5. Insert a putty knife (thickness of about 0.5 mm) into the gap between the choke cover and the door panel assembly as shown in Figure C-5.
6. Lift up the choke cover.
7. Now, the choke cover is free from the door panel assembly.

NOTE: When carrying out any repair to the door, do not bend or wrap the slit choke (tabs on the door panel assembly) to prevent microwave leakage.

DOOR HANDLE ASSEMBLY

8. Remove the two (2) screws holding the door handle assembly to the door panel assembly through the door frame.
9. Now, the door handle is free.

DOOR PANEL ASSEMBLY, LATCH HEAD R AND LATCH HEAD L

10. Remove the fourteen (14) screws holding the door panel assembly to the door frame.
11. Remove the door panel assembly from the door frame.
12. Remove the one (1) screw holding the latch head R to the door panel assembly.
13. Remove the latch spring R from the latch head R and the handle lever.
14. Now, the latch head R is free.
15. Remove the one (1) screw holding the latch head L to the door panel assembly.

16. Remove the latch spring L from the latch head L and the handle lever.
17. Now, the latch head L is free.
18. Release the two (2) handle springs from the two (2) handle levers.
19. Pull out the two (2) handle pins from the two (2) handle levers.
20. Remove the two (2) handle levers from the door panel.
21. Now, the door panel is free.

MIDDLE DOOR GLASS

22. Remove the two (2) screws holding the glass mounting angle B to the door frame.
23. Remove the middle door glass from the door frame.
24. Now, the middle door glass is free.

FRONT DOOR GLASS

25. Remove each two (2) screws holding the two glass mounting angles A to the door frame.
26. Remove the two (2) glass mounting angles A from the door frame.
27. To release the two (2) tabs holding the lower end of the front door glass, slide the front door glass upward.
28. Release the three (3) tabs holding the upper end of the front door glass and remove the front door glass from the door frame.
29. Now, the front door glass is free.

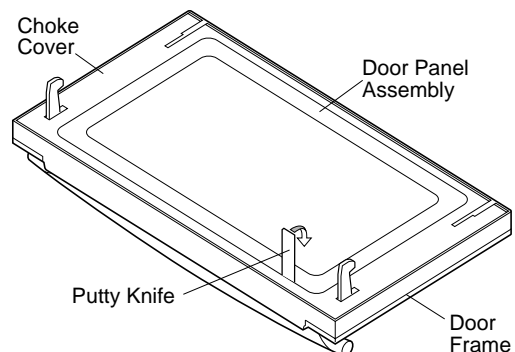


Figure C-5. Door Disassembly

CONTROL PANEL ASSEMBLY AND CPU UNIT REMOVAL

Control panel assembly

1. CARRY OUT 3D CHECKS.
2. Disconnect the 20-pin harness from the connectors CN-G and CN-H on the power unit.
3. Remove the four (4) screws holding the control panel

assembly to the oven cavity front plate.

4. Slide the control panel assembly leftward to release the eight (8) tabs of the control panel assembly from the oven cavity front plate.
5. Now, the control panel assembly is free.

CPU unit

6. Remove the two (2) screws holding the panel angle to the panel sub assembly.
7. Release the panel angle from the two (2) tabs of the panel sub assembly first.
8. Pull out the panel angle from the panel sub assembly and remove it.
9. Remove the twenty-two (22) screws holding the CUP unit to the panel sub assembly.
10. Now, the CPU unit is free.

NOTE: After the panel angle is removed from the panel sub assembly, it can be found that the bottom side of the panel sub assembly is

melted and transformed by heat. But it is not abnormal and no problem to use the oven.

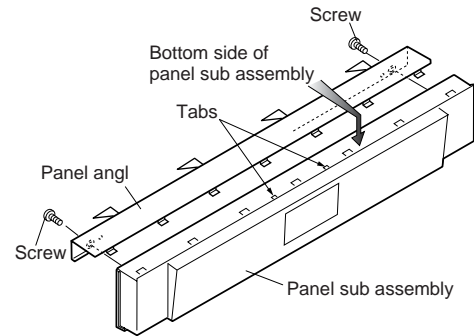


Figure C-6. Panel Angle Removal

MICROWAVE MEASUREMENT

After adjustment of secondary interlock switch, monitor switch, 3rd. latch switch, door sensing switch and door are completed individually or collectively, the following leakage test must be performed with a survey instrument and it must be confirmed that the result meets the requirements of the performance standard for microwave oven.

REQUIREMENT

The safety switch must prevent microwave radiation emission in excess of $5\text{mW}/\text{cm}^2$ at any point 5cm or more from external surface of the oven.

PREPARATION FOR TESTING:

Before beginning the actual test for leakage, proceed as follows;

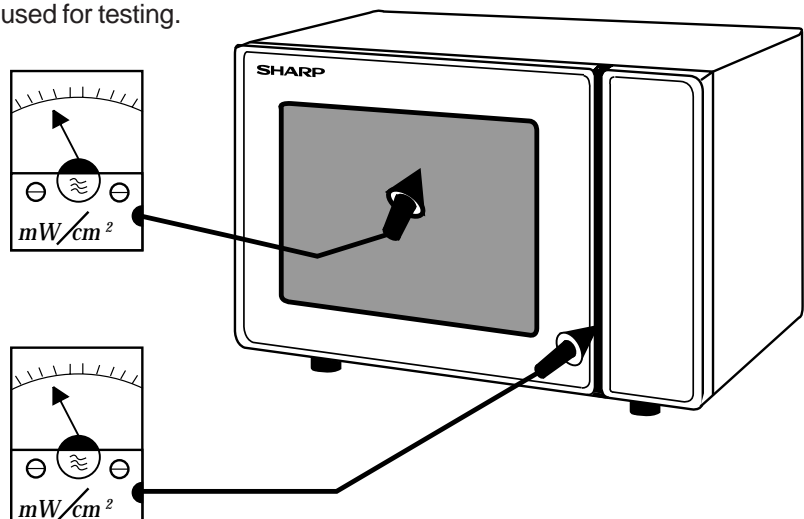
1. Make sure that the test instrument is operating normally as specified in its instruction booklet.

Important:

Survey instruments that comply with the requirement for instrumentations as prescribed by the performance standard for microwave ovens must be used for testing. Recommended instruments are:

NARDA 8100
NARDA 8200
HOLADAY HI 1500
SIMPSON 380M

2. Place the oven tray into the oven cavity.
3. Place the load of $275 \pm 15\text{ml}$ of water initially at $20 \pm 5^\circ\text{C}$ in the centre of the oven tray. The water container should be a low form of 600 ml beaker with inside diameter of approx. 8.5cm and made of an electrically non-conductive material such as glass or plastic.
The placing of this standard load in the oven is important not only to protect the oven, but also to insure that any leakage is measured accurately.
4. Close the door and turn the oven ON with the timer set for several minutes. If the water begins to boil before the survey is completed, replace it with 275ml of cool water.
5. Move the probe slowly (not faster than $2.5\text{cm}/\text{sec.}$) along the gap.
6. The microwave radiation emission should be measured at any point of 5cm or more from the external surface of the oven.



Microwave leakage measurement at 5 cm distance

TEST DATA AT A GLANCE

PARTS	SYMBOL	VALUE / DATA
Fuse	F1	20A 250V
Fuse	F2	F10A
High voltage fuse	F3	0.75A 5 kV
Thermal cut-out	TC1	170°C Off / 155°C On
Thermal cut-out	TC2	150°C Off / 130°C On
Temperature fuse	TF	150°C Off
Thermistor		Approx. 360k Ω - 152k Ω at 20°C - 30°C
Top heating element	H1	Approx. 34 Ω / Insulation resistance >10M Ω
Side heating element	H2	Approx. 43 Ω / Insulation resistance >10M Ω
Oven lamp	OL	240 V 25W
High voltage capacitor	C1	1.13 μ F AC 2300V
Convection motor capacitor	C2	1.5 μ F 400V
Magnetron	MG	Filament < 1 Ω / Filament – chassis ∞ ohm.
High voltage transformer	T	Filament winding < 1 Ω Secondary winding Approx. 95 Ω Primary winding Approx. 1.2 Ω

WARNING: DISCONNECT THE PLUG WHEN MEASURING RESISTANCE.

SCHEMATIC

NOTE: CONDITION OF OVEN

1. DOOR CLOSED.

2. CLOCK APPEARS ON DISPLAY.

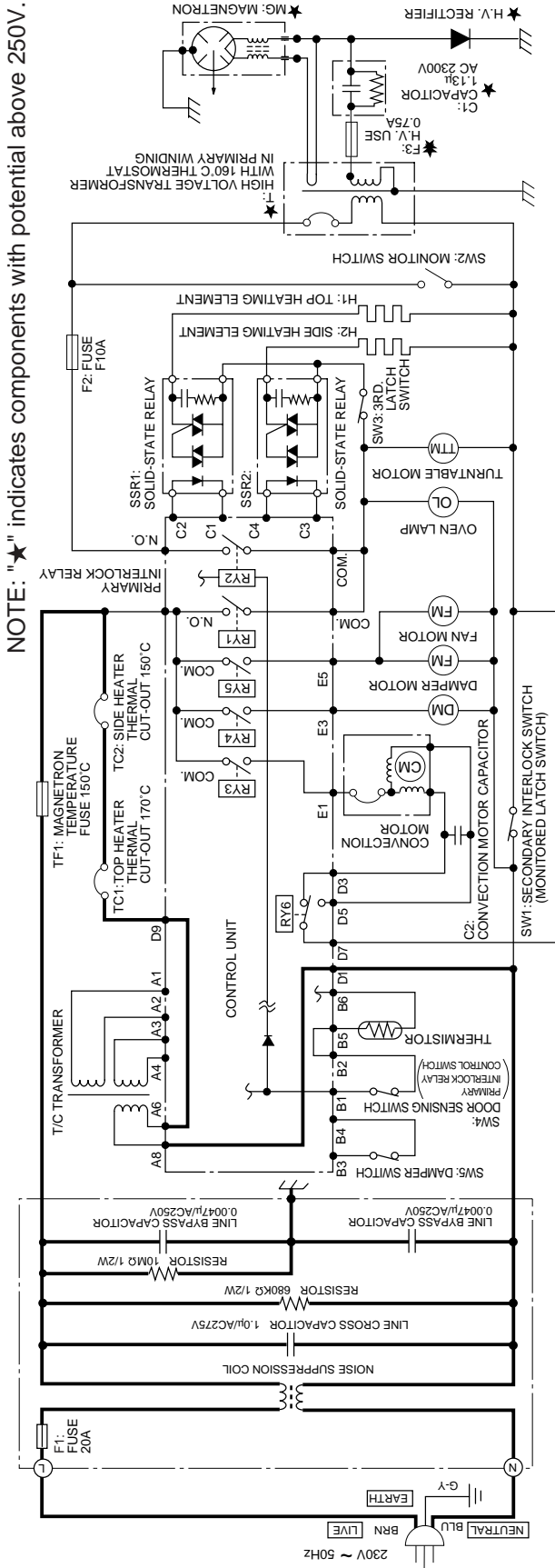


Figure O-1. Oven Schematic-Off Condition

SCHEMATIC

NOTE: CONDITION OF OVEN

1. DOOR CLOSED.

2. COOKING TIME ENTERED.

3. "START" KEY TOUCHED.

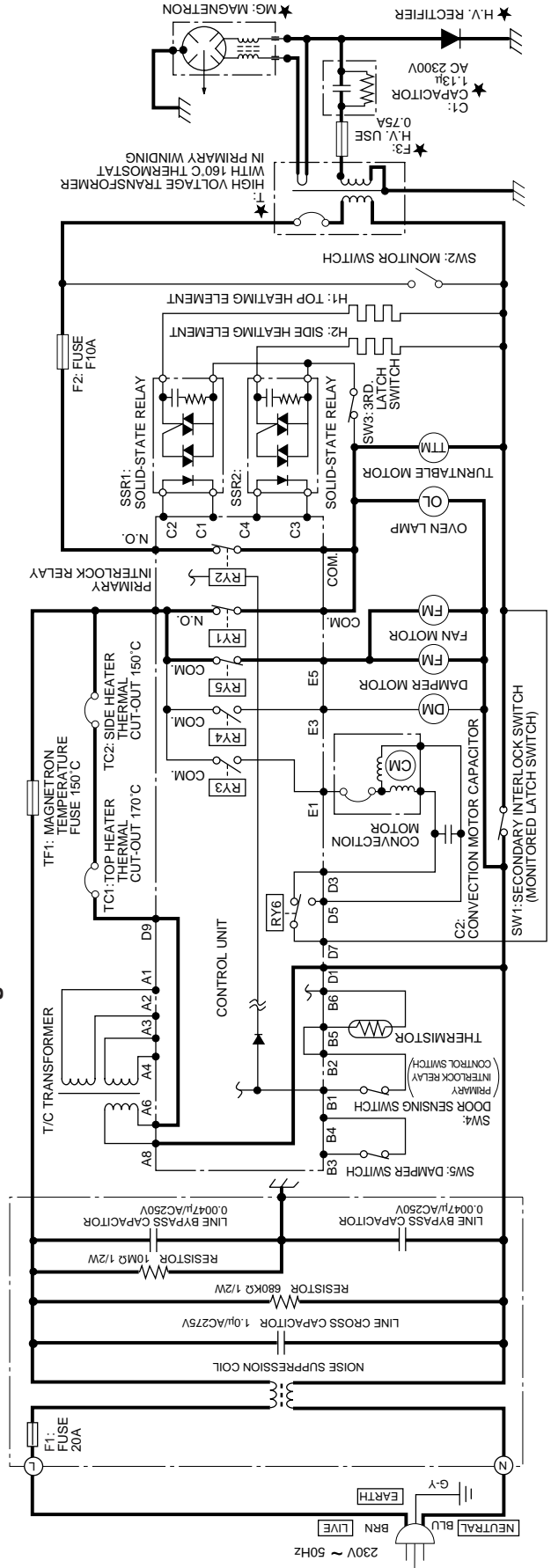
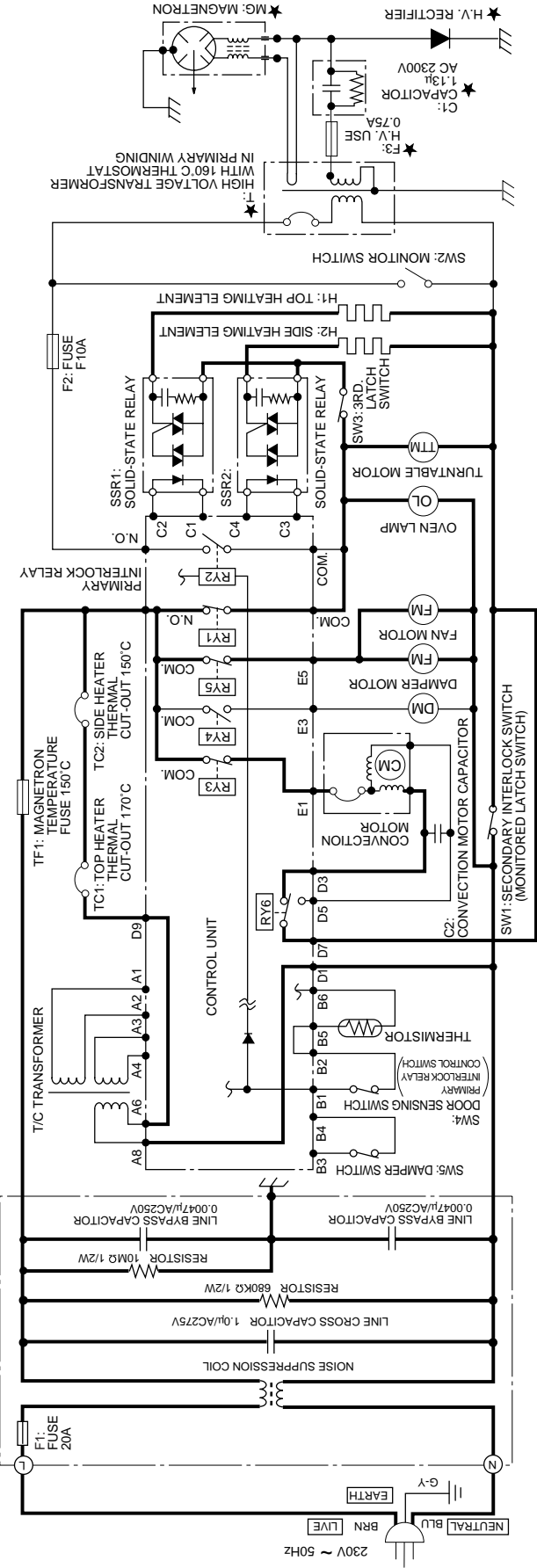


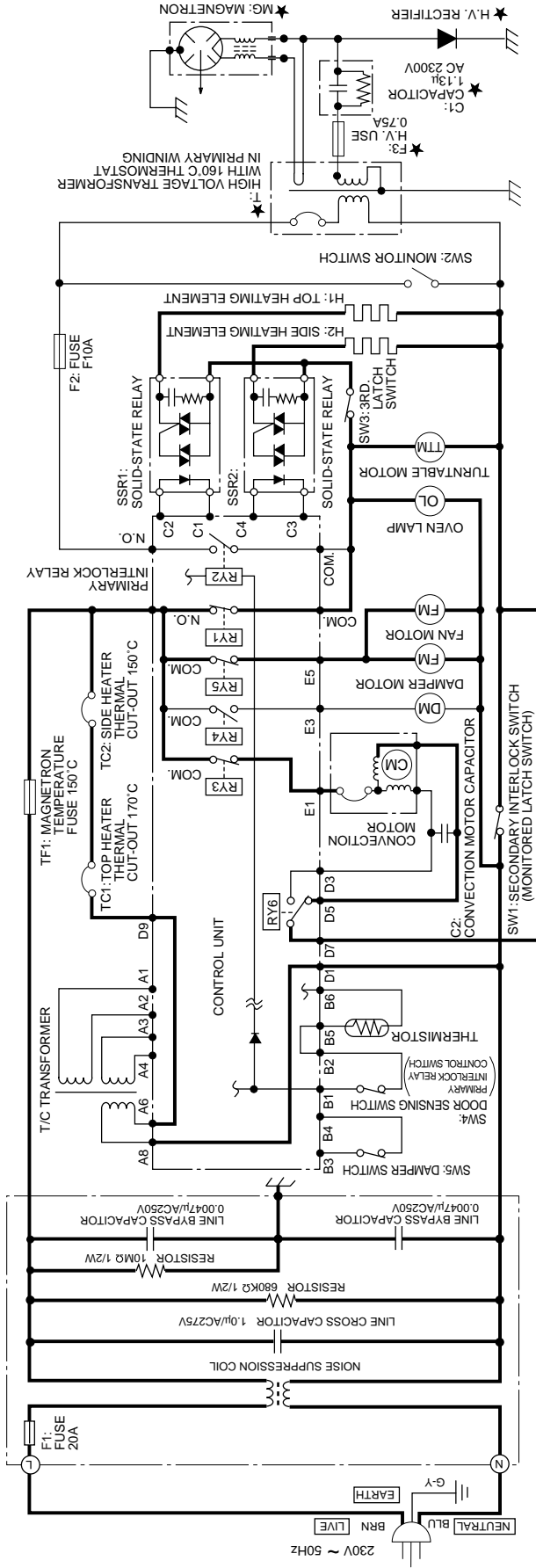
Figure O-2. Oven Schematic-Microwave Cooking Condition



SCHEMATIC
NOTE: CONDITION OF OVEN

1. DOOR CLOSED.
2. COOKING TIME ENTERED.
3. CONVECTION TEMPERATURE SELECTED.
4. "START" KEY TOUCHED.

Figure O-3. Oven Schematic-Convection (or Reheat) Cooking Condition



SCHEMATIC
NOTE: CONDITION OF OVEN

1. DOOR CLOSED.
2. COOKING TIME ENTERED.
3. "GRILL" KEY TOUCHED.
4. "START" KEY TOUCHED.

Figure O-4. Oven Schematic-Grill Cooking Condition



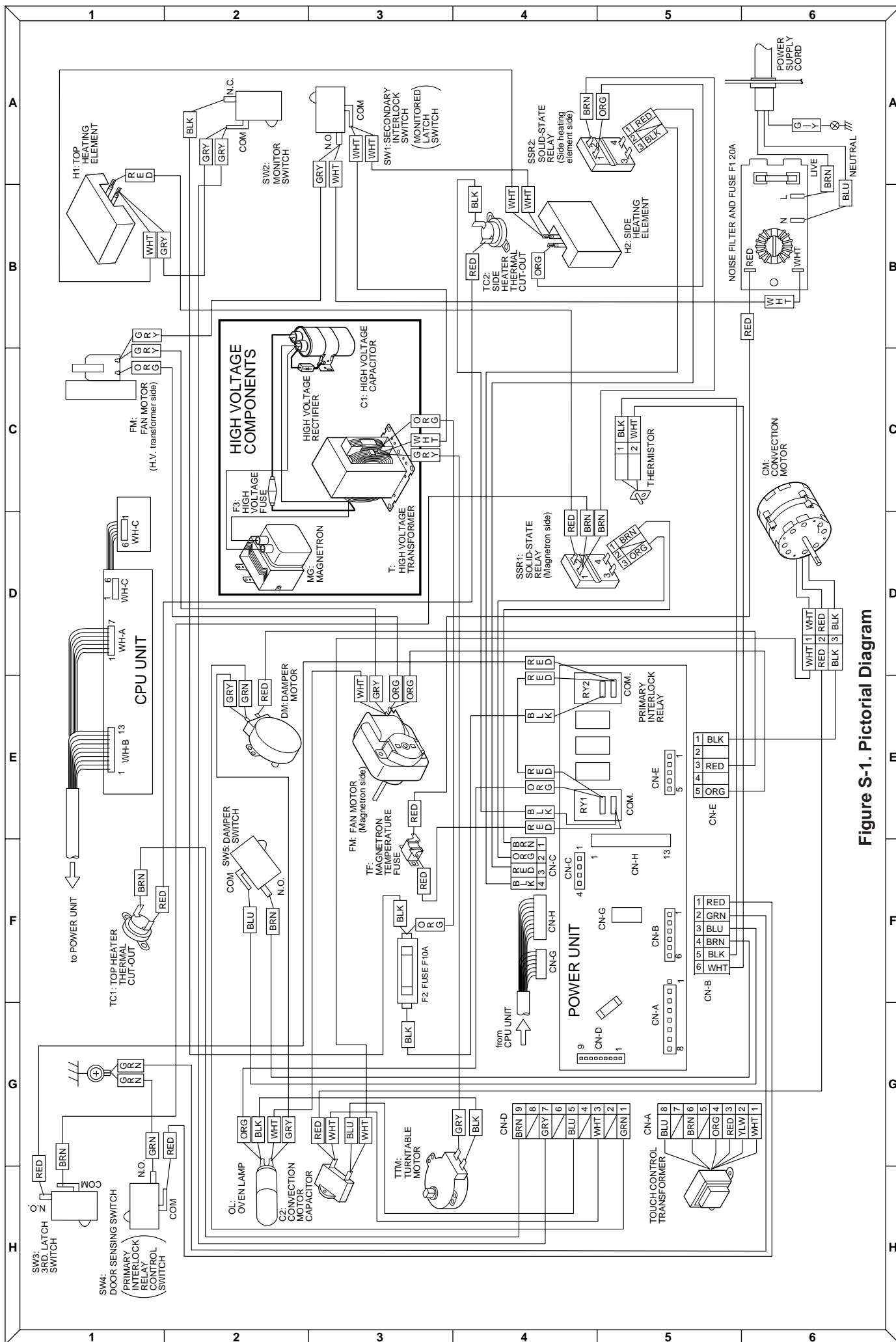
Schematic

NOTE: CONDITION OF OVEN

1. DOOR CLOSED.
2. COOKING TIME ENTERED.
3. "DUAL2" KEY TOUCHED.
4. MICROWAVE POWER LEVEL SELECTED.
5. CONVECTION TEMPERATURE SELECTED.
6. "START" KEY TOUCHED.



Figure O-6. Oven Schematic-Dual2 Cooking Condition



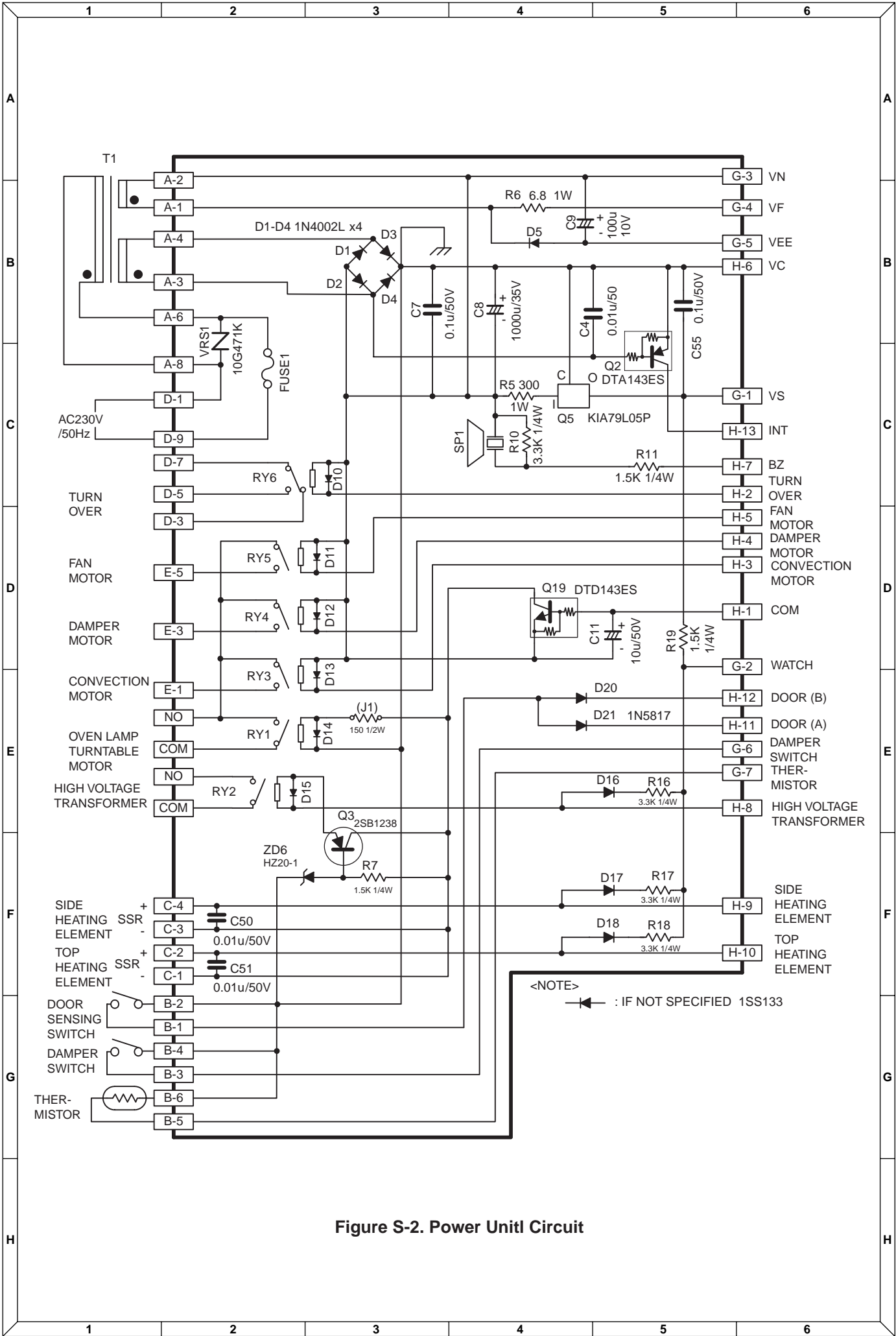
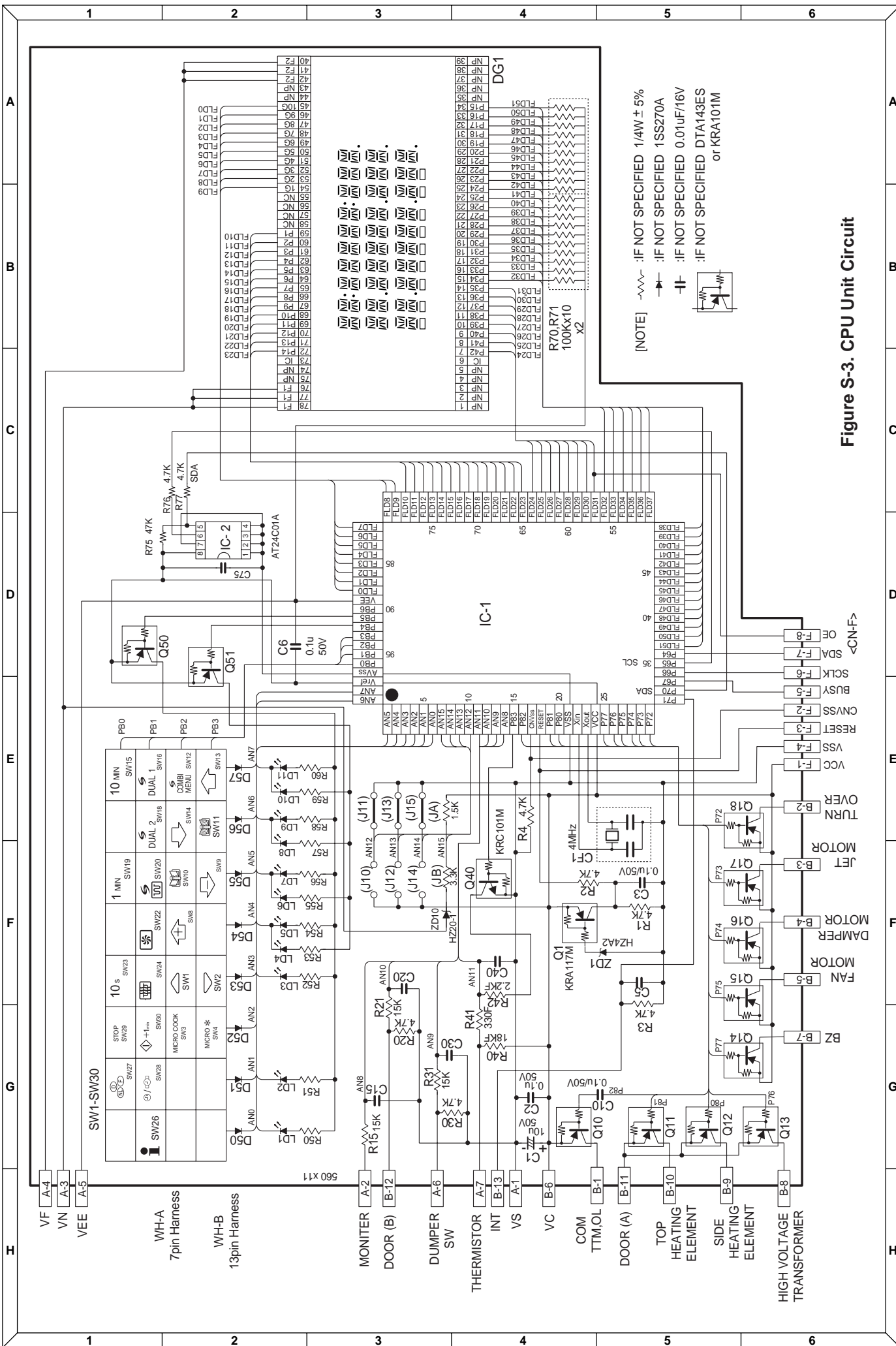


Figure S-2. Power Unitl Circuit



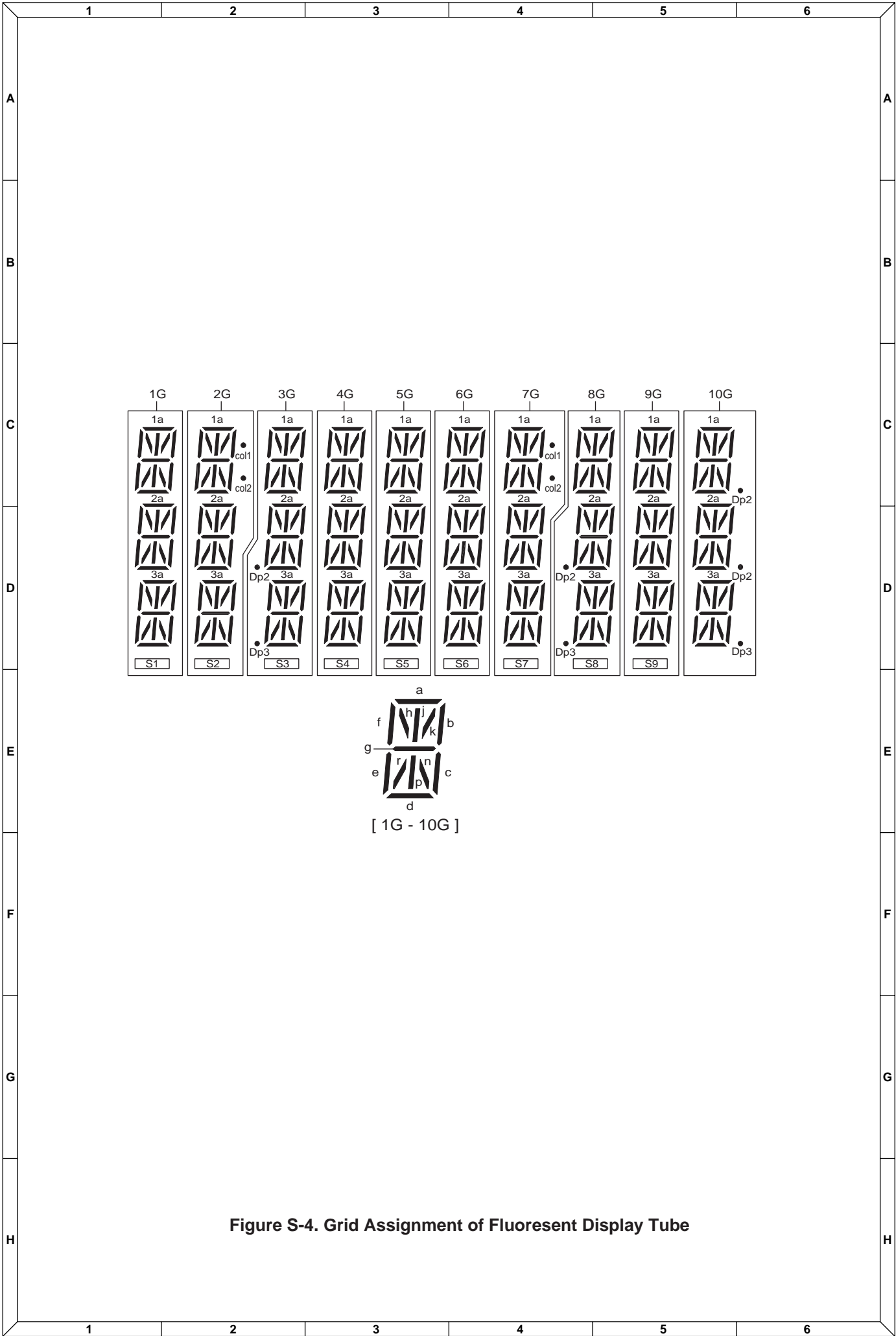
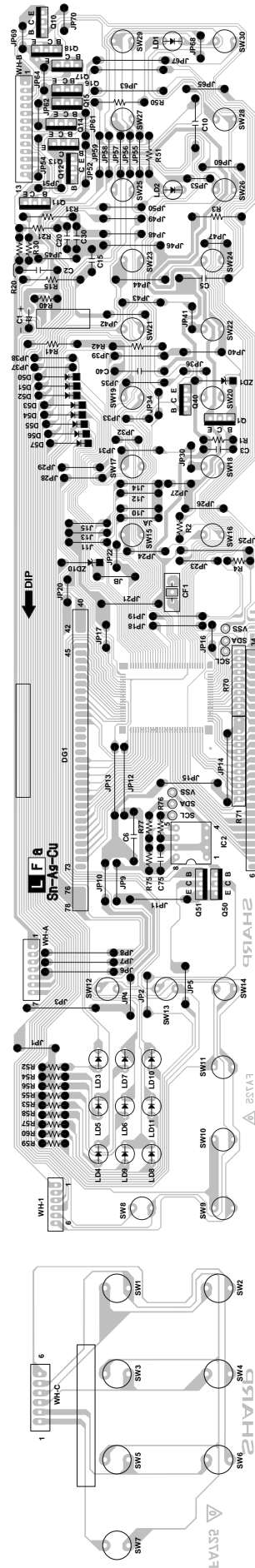
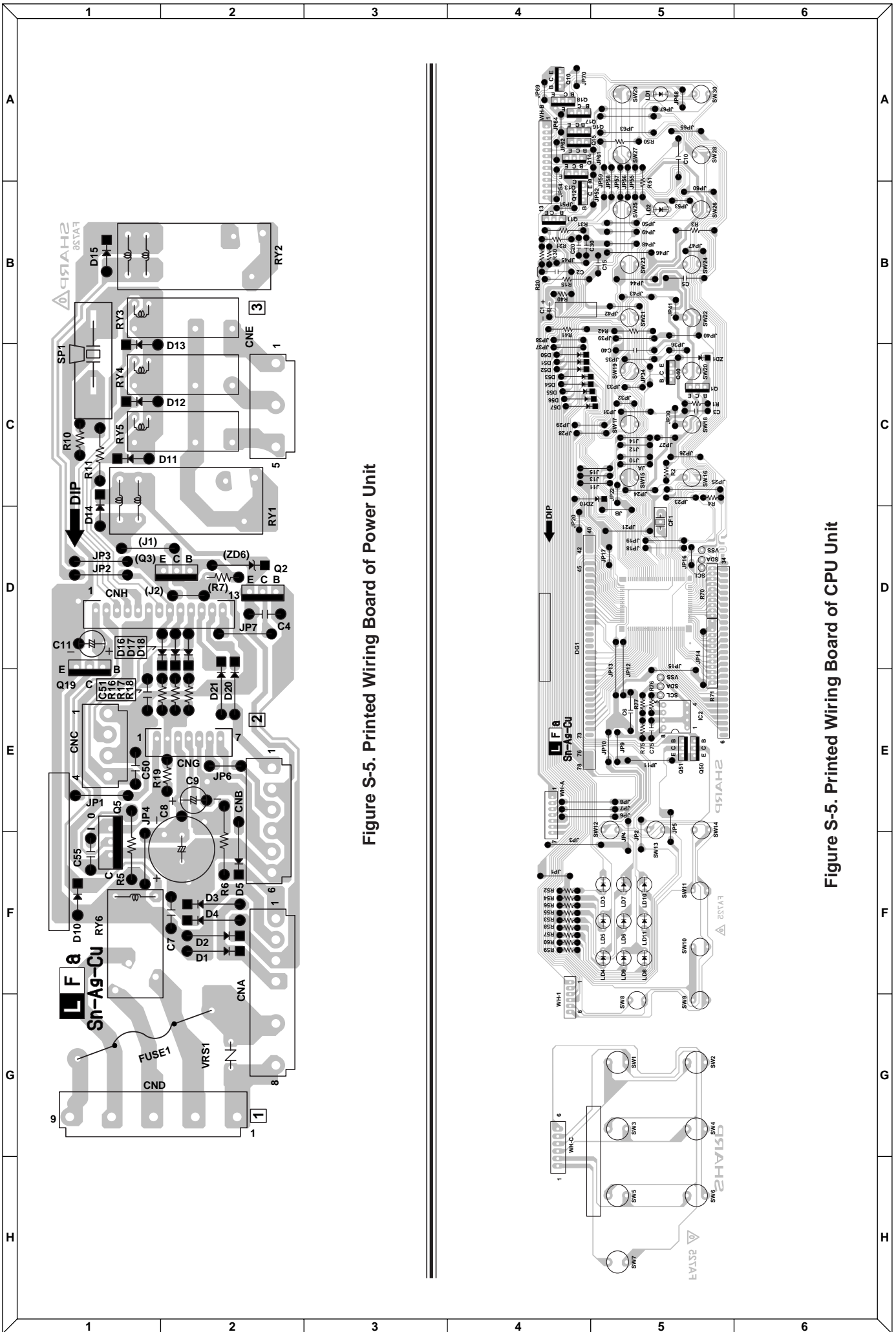


Figure S-4. Grid Assignment of Fluorescent Display Tube



PARTS LIST

Note: The parts marked "Δ" may cause undue microwave exposure.

The parts marked "*" are used in voltage more than 250V.

REF. NO.	PART NO.	DESCRIPTION	Q'TY	CODE
----------	----------	-------------	------	------

ELECTRICAL PARTS

*	C1	RC-QZA315WRZZ	High voltage capacitor	1	AX
	C2	RC-QZA314WRZZ	convection motor capacitor	1	AH
	CM	RMOTCA011WREZ	Convection motor	1	BH
	DM	RMOTDA191WRE0	Damper motor	1	AS
	DM	RMOTDA243WRZZ	Damper motor (Interchangeable) for production use	1	--
*	F1	QFS-BA009WRE0	Fuse 20A	1	AH
	F2	QFS-CA026WRZZ	Fuse F10A	1	AH
	F3	QFS-IA009WRZZ	High voltage fuse 0.75A	1	AS
	FM	FMOTEA459WRKZ	Fan motor assy	2	BA
	H1	RHET-A261WRZZ	Top heating element	1	AX
Δ*	H2	RHET-A262WRZZ	Side heating element	1	AX
	MG	RV-MZA294WRE0	Magnetron	1	BL
	OL	RLMPTA083WRZZ	Oven lamp	1	AM
	SSR1-2	VHRG3NE22TL-1	Solid-state relay	2	AY
	SW1	QSW-MA085WRE0	Secondary interlock switch	1	AF
	SW1	QSW-MA137WRE0	Secondary interlock switch (Interchangeable)	1	AH
	SW2	QSW-MA086WRE0	Monitor switch	1	AF
	SW2	QSW-MA138WRE0	Monitor switch (Interchangeable)	1	AH
	SW3	QSW-MA085WRE0	3rd latch switch	1	AF
	SW3	QSW-MA137WRE0	3rd latch interlock switch (Interchangeable)	1	AH
	SW4	QSW-MA085WRE0	Door sensing switch	1	AF
	SW4	QSW-MA137WRE0	Door sensing switch (Interchangeable)	1	AH
	SW5	QSW-MA085WRE0	Dumper switch	1	AF
	SW5	QSW-MA137WRE0	Dumper switch (Interchangeable)	1	AH
	T	RTRN-A688WRZZ	High voltage transformer	1	BS
	TC1	RTHM-A109WRE0	Thermal cut out 170 deg.C(Top heater) 170deg.C OFF 155deg.C ON	1	AM
	TC2	RTHM-A110WRE0	Thermal cut out 150 deg.C(Side heater) 150deg.C OFF 130deg.C ON	1	AK
	TF	QFS-TA014WRE0	Temperature fuse 150 deg. C (MG)	1	AG
	TTM	RMOTDA189WRE0	Turntable motor	1	AT
	TTM	RMOTDA227WRE0	Turntable motor (Interchangeable)	1	AW
*	1- 1	FH-HZA053WRE0	Thermistor	1	AM
	1- 2	QACC-A131WRZZ	Power supply cord	1	AX
	1- 3	FH-DZA104WRKZ	High voltage rectifier assy	1	AN
	1- 4	FPWBFA357WRKZ	Noise filter	1	BB
	1- 5	QFSHDA019WRE0	Fuse holder	1	AH
	1- 6	RTRNPA002WRZZ	Touch control transformer	1	AQ

CABINET PARTS

2- 1	GCABDA106WRPZ	Back plate	1	AZ
2- 2	GDAI-A356WRWZ	Bottom plate	1	AW
2- 3	GLEGPA092WREZ	Leg	2	AD
2- 4	GCABUA874WRPZ	Outer case cabinet	1	BH
2- 5	GCOVHA449WRWZ	Turntable motor cover	1	AP

CONTROL PANEL PARTS

3- 1	DPWBFC307WRKZ	Power unit	1	BK
3- 2	DPWBFC306WRKZ	CPU unit	1	BL
3- 3	FPNLCB648WRKZ	Panel sub assy	1	BC
3- 3-1	HDECAA231WRPZ	Sus decoration	1	AU
3- 3-2	HDECQA228WRTZ	Panel decoration	1	AN
3- 3-3	XEBSD30P08000	Special screw	7	AA
3- 4	PSHEPA877WREZ	Key sheet	1	AW
3- 5	GMADIA115WRFZ	Display window	1	AD
3- 6	LANGKB018WRPZ	Panel angle	1	AL
3- 7	XEBSD30P08000	Screw ; 3mm x 8mm	24	AA
3- 8	PCUSGA583WREZ	Cushion	1	AH

OVEN PARTS

4- 1	FDUC-A371WRKZ	Damper duct assembly	1	BB
4- 2	PZETEA084WRFZ	PWB mounting angle	1	AL
4- 3	LANGQA571WRPZ	Motor mounting angle	1	AS
4- 4	MCAMPA102WRFZ	Damper cam	1	AD
4- 5	NSFTTA143WREZ	Damper shaft	1	AB
4- 6	PCUSGA604WRPZ	Damper cushion	1	AK
4- 7	PFTA-A033WRWZ	Damper	1	AS
4- 8	LANG-A097WRPZ	Catalyst angle	3	AN
4- 9	LANGFA242WRPZ	Heater mounting angle A	1	AS
4-10	PDUC-A821WRTZ	Heater duct upper	1	BF
4-11	PFIL-A020WREZ	Catalyst	3	BC
4-12	LANGFA260WRPZ	Heater mounting angle B	1	AS
4-13	PDUC-A822WRTZ	Heater duct left	1	BF
4-14	FANGTA167WRKZ	Coupling assembly	1	AK

REF. NO.	PART NO.	DESCRIPTION	Q'TY	CODE
4-15	FDUC-A369WRKZ	Exhaust duct	1	BB
4-16	FFANMA016WRKZ	Convection fan assembly	1	AZ
4-17	LANGFA243WRPZ	Convection motor mounting angle	1	AS
4-18	PDUC-A825WRPZ	Convection duct	1	AW
4-19	PFFP-A229WREZ	Thermal insulator back	1	AP
4-20	PREFHA072WRWZ	Thermal cover back	1	AV
4-21	PSKR-A388WRWZ	Divide plate A	1	AS
4-22	PSKR-A389WRWZ	Divide plate B	1	AS
4-23	FOVN-A517WRTZ	Oven cavity	1	BP
4-24	LANG-A095WRPZ	Turntable mounting angle	1	AN
4-25	LANGQA569WRPZ	Separator left	1	AS
4-26	LANGQA590WRWZ	Lamp mounting angle	1	AN
4-27	PSKR-A387WRPZ	Magnetron separator	1	AS
4-28	PCUSGA601WREZ	Cushion	1	AE
4-29	PCUSGA603WREZ	Cushion	2	AD
4-30	PFFP-A225WRPZ	Thermal insulation L	1	AR
4-31	PSKR-A377WRFZ	Rear separator	1	AH
4-32	PFFP-A227WRPZ	Thermal insulation Upper	1	AS
4-33	PFFP-A228WRPZ	Thermal insulation Bottom	1	AQ
4-34	PGLSPA579WRZZ	Lamp glass	1	AF
4-35	PPACGA189WREZ	Silcon packing	1	AE
4-36	PREFHA069WRPZ	Thermal cover Upper	1	AV
4-37	PREFHA070WRPZ	Thermal cover Left	1	AV
4-38	PREFHA071WRPZ	Thermal cover D	1	AV
4-39	LANGQA572WRPZ	Fan motor mounting angle	1	AS
4-40	LBNDKA154WRPZ	Capacitor holder	1	AH
4-41	FHNG-A305WRYZ	Oven hinge Left	1	AU
4-42	FHNG-A306WRYZ	Oven hinge Right	1	AU
4-43	PHOK-A125WRFZ	Latch hook Right	1	AE
4-44	PHOK-A126WRFZ	Latch hook Left	1	AE
4-45	GCOVHA438WRFZ	Exhaust cover	1	AH
4-46	LANG-A096WRPZ	Transformer mounting angle	1	AN
4-47	LANGFA241WRWZ	Chassis support	2	AS
4-48	LANGKB019WRWZ	Magnetron guide	1	AV
4-49	MCAMPA107WRMZ	Door cam Left	1	AP
4-50	MCAMPA108WRMZ	Door cam Right	1	AP
4-51	MSPTA208WREZ	Door spring	2	AC
4-52	PCOVPA379WREZ	Waveguide cover	1	AE
4-53	PCUSGA602WREZ	Cushion	1	AG
4-54	GCOVHA446WREZ	Screw cap	1	AC
4-55	PCUSGA584WREZ	Cushion	2	AB
4-56	PCUSUA589WREZ	Cushion	1	AC
4-57	PCUSGA585WREZ	Cushion	1	AB
4-58	PCUSUA591WREZ	Cushion	1	AD
4-59	PCUSUA592WREZ	Cushion	2	AC
4-60	PCOVPA389WREZ	Edge cover	3	AC
4-61	PCUSUA614WREZ	Cushion	1	AB
4-62	PCUSUA609WREZ	Cushion	1	AD
4-63	PCUSUA610WREZ	Cushion	1	AE
4-64	PCUSUA611WREZ	Cushion	2	AB
4-65	PCUSUA612WREZ	Cushion	1	AC
4-66	PCUSUA613WREZ	Cushion	1	AC
4-67	LANGQA581WRPZ	Noise filter angle	1	AS
4-68	PCOVPA390WRPZ	HVC cover	1	AP
4-69	PCUSGA586WREZ	Cushion	1	AC
4-70	PCUSGA600WREZ	Cushion	1	AF
4-71	PCOVPA393WRPZ	Latch cover	1	AL
4-72	PCUSUA616WREZ	Cushion	1	AE
4-73	PCUSGA607WREZ	Cushion	1	AF

DOOR PARTS

5	CDORFA958WRKZ	Door assembly	1	BS
5- 1	DDORFB039WRYZ	Door panel assembly	1	BH
5- 2	JHNDPA210WREZ	Door handle	1	BF
5- 3	JHNDPA211WRFZ	Door handle cap L	1	AH
5- 4	MJNTPA002WRFZ	Joint	2	AG
5- 5	XCPWW30P10000	Screw : 3mm x 10mm	4	AA
5- 6	GCOVHA439WRFZ	Choke cover	1	AR
5- 7	GWAKPA860WRFZ	Door frame	1	BA
5- 8	HDECAA230WRPZ	Stainless cover	1	AY
5- 9	HDECQA227WRTZ	Door decoration	1	AT
5-10	LANGKA989WRPZ	Glass mounting angle A	2	AG
5-11	LANGKA990WRPZ	Glass mounting angle B	1	AQ
5-12	LSTPPA214WRFZ	Latch head Right	1	AD
5-13	LSTPPA215WRFZ	Latch head Left	1	AD
5-14	MSPRCA139WREZ	Handle spring	2	AF
5-15	PGLSPA577WREZ	Front door glass	1	AX
5-16	PGLSPA578WREZ	Middle door glass	1	AU
5-17	MLEVFA088WRWZ	Handle lever	2	AK

REF. NO.	PART NO.	DESCRIPTION	Q'TY	CODE
5-18	MSPRCA137WREZ	Latch spring Right	1	AC
5-19	MSPRCA138WREZ	Latch spring Left	1	AC
5-20	XEPSD40P08000	Screw : 4mm x 8mm	16	AB
5-21	XEPSD40P20000	Screw : 4mm x 20mm	6	AB
5-22	LPIN-A179WREZ	Handle pin	2	AG
5-23	LX-BZ0139WRE0	Special screw	2	AA
5-24	JHNDPA220WRFZ	Door handle cap R	1	AK
5-25	PCUSGA588WRPZ	Cushion	2	AH

MISCELLANEOUS

6- 1	FAMI-A108WRMZ	High rack assembly	1	AH
6- 2	FAMI-A109WRMZ	Low rack assembly	1	AH
6- 3	FROLPA071WRY0	Turntable support	1	AS
6- 4	NTNT-A113WRHZ	Turntable tray	1	AU
6- 5	PSLD-A030WRHZ	Splash guard	1	AR
6- 6	TCADCA786WRRZ	Cook book	1	AS
6- 7	TINS-A691WRRZ	Instruction book	1	AP
6- 8	PZET-A011WRE0	Thermal insulator	1	AA
6- 9	FW-VZB956WREZ	Main wire harness	1	AU
6-10	FW-VZB920WREZ	Thermistor harness	1	AN
6-11	LBSHCA012WRE0	Cord bushing	1	AD
6-12	LHLDWA012WRE0	Purse lock L	1	AB
6-13	TCAUHA168WRR0	H caution label	1	AH
6-14	LHLDWA013WRE0	Purse lock LL	1	AC
6-15	LHLDWA029WRE0	Cord holder	1	AB
6-16	TLABNA792WRRZ	Touch guide in Dutch	1	AK
6-17	TLABNA793WRRZ	Touch guide in French	1	AK
6-18	TLABNA794WRRZ	Touch guide in German	1	AK

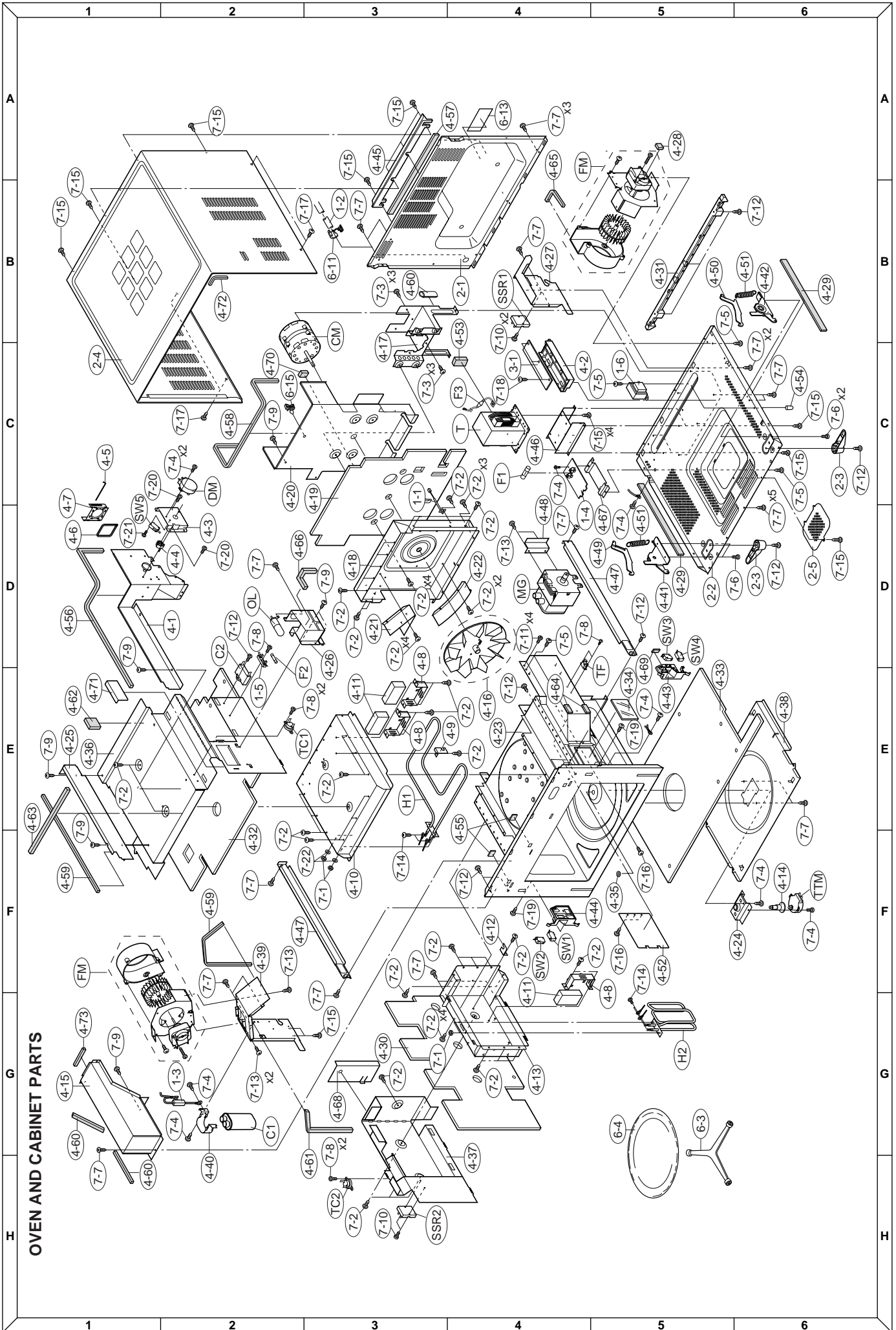
SCREWS NUTS AND WASHERS

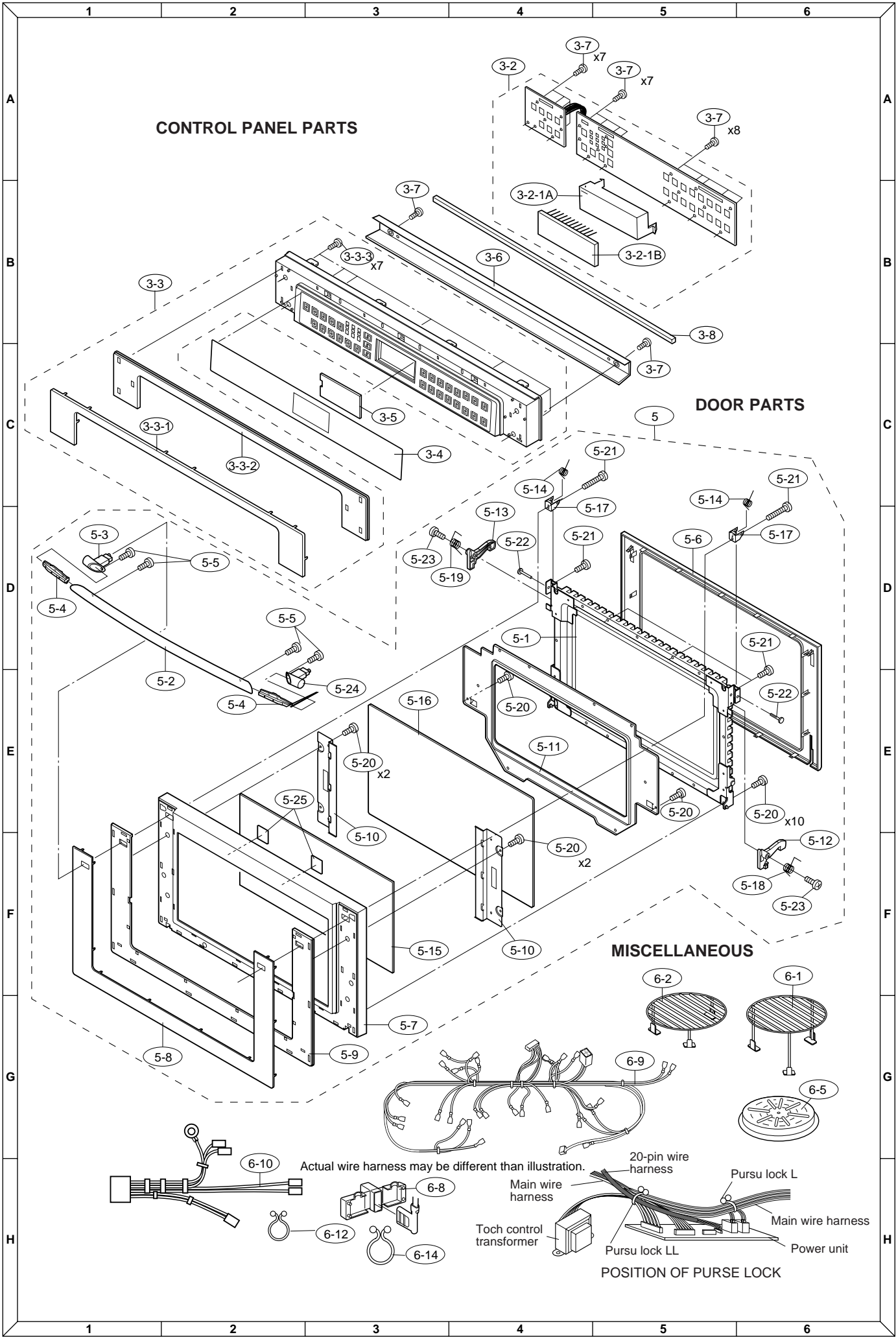
7- 1	XNEUW40-32000	Nut: 4mm x 3.2mm	4	AA
7- 2	XOTWW40P08000	Screw : 4 mm x 8 mm	60	AB
7- 3	XBTSD40P06000	Screw : 4 mm x 6 mm	6	AA
7- 4	XHPSD40P08K00	Screw : 4 mm x 8 mm	9	AC
7- 5	XHTSD40P08RV0	Screw : 4mm x 8mm	6	AA
7- 6	XHPSD40P08KS0	Screw : 4mm x 8mm	4	AA
7- 7	XOTSD40P08000	Screw : 4mm x 8mm	32	AA
7- 8	LX-BZA146WREZ	Special screw	7	AC
7- 9	LX-BZA148WREZ	Special screw	7	AC
7-10	LX-BZA147WREZ	Special screw	4	AC
7-11	LX-EZA060WREZ	Special screw	4	AC
7-12	XOTSD40P10000	screw : 4mm x 10mm	10	AA
7-13	XHTSD40P08000	Screw : 4mm x 8mm	5	AA
7-14	LX-BZA144WREZ	Special screw	4	AB
7-15	XOTSD40P12RV0	Screw : 4mm x 12mm	18	AA
7-16	LX-BZA143WREZ	Special screw	4	AB
7-17	XOTSE40P08000	Screw : 4 mm x 8 mm	4	AA
7-18	XEPSD30P10000	Screw : 3 mm x 10 mm	3	AA
7-19	LX-CZ0052WRE0	Special screw	2	AA
7-20	XCPSD40P08000	Screw : 4mm x 8mm	2	AA
7-21	XBPSD30P14K00	Screw : 3mm x 14mm	1	AB
7-22	XWSUW40-10000	Washer : 4mm x 1mm	2	AA

HOW TO ORDER REPLACEMENT PARTS

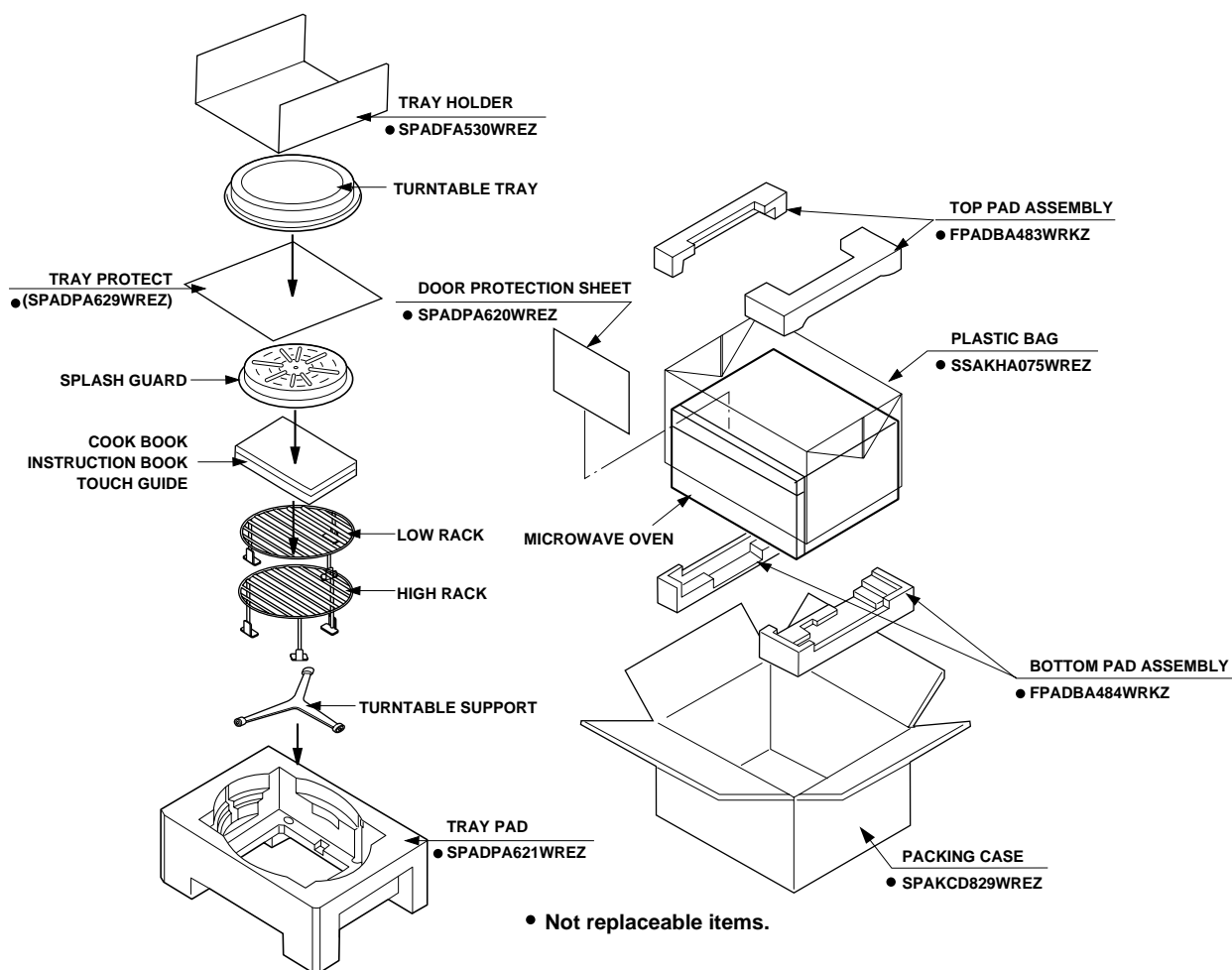
To have your order filled promptly and correctly, please furnish the following information.

1. MODEL NUMBER 2. REF. NO. 3. PART NO. 4. DESCRIPTION





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